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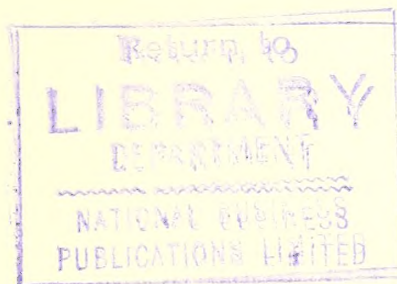
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### MINES BRANCH

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- Building and Ornamental Stones of Canada (British Columbia.) Vol. V., by W. A. Parks, Ph. D.
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The Coalfields and Coal Industry of Eastern Canada, by F. W. Gray.
- The Value of Peat Fuel for the Generation of Steam, by J. Blizard, B. Sc.
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- Summary Report of the Mines Branch, 1920.  
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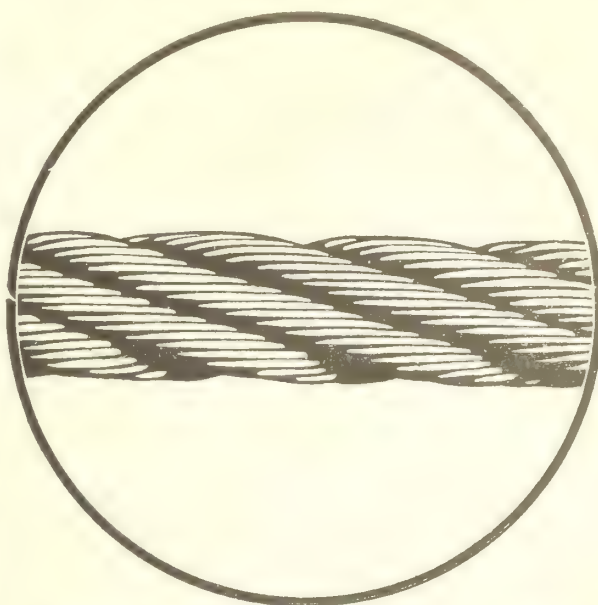
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# Ontario's



PROVINCE OF ONTARIO

# Minerals

DEPARTMENT OF MINES

HON H. MILLS, Minister of Mines

## Mineral Areas.

Ontario, with its 407,262 square miles, contains many millions of acres in which the geological formations are favorable for the occurrence of minerals, 70 per cent of the area being underlain by rocks of pre-Cambrian age. The phenomenally rich silver mines of Cobalt occur in these rocks; so also do the far-famed nickel-copper deposits of Sudbury, the gold of Porcupine and Kirkland Lake, and the iron ore of Magpie and Moose Mountain mines.

## Economic Minerals.

In addition to the above, practically all economic minerals (coal and tin excepted) are found in Ontario:—actinolite, apatite, arsenic, asbestos, cobalt, corundum, feldspar, fluor-spar, graphite, gypsum, iron pyrites, lead, mica, molybdenite, natural gas, palladium, petroleum, platinum, quartz, salt, talc and zinc. This Province has the largest deposits on the continent of talc, feldspar, mica and graphite.

Building materials, such as ornamental marble, limestone, sandstone, granite, trap, sand and gravel, lime, portland cement, brick and tile, meet every demand.

## Mineral Production.

Preliminary returns show the output of the mines and metallurgical works of the Province for the year 1921 to be worth \$48,128,387, of which the metallic production was \$27,574,202.

The following figures show the rapid growth of Ontario's mineral industry by five-year periods since 1891:

| Year.         | Value.      | Year.         | Value.       |
|---------------|-------------|---------------|--------------|
| 1891 .. . . . | \$4,705,672 | 1906 .. . . . | \$22,388,383 |
| 1896 .. . . . | 5,235,003   | 1911 .. . . . | 41,976,797   |
| 1901 .. . . . | 11,831,086  | 1916 .. . . . | 65,303,822   |

## Dividends.

Dividends and bonuses paid to the end of 1921 amounted to \$23,140,734 for gold mining companies, and \$84,388,185 for silver mining companies or a total of \$107,528,919.

## Mining Regulations.

A miner's license costs \$5.00 per annum, and entitles the holder to stake out in any or every mining division three claims of 40 acres each. After performing 200 days' assessment work on a claim, patent may be obtained from the Crown on payment of \$2.50 or \$3.00 per acre, depending on location in unsurveyed or surveyed territory.

## Assay Office.

The Provincial Assay Office at No. 5 Queen's Park, Toronto, is maintained by the Department of Mines for the free identification of minerals, free assays under the provisions of the Mining Act of Ontario, and also for general assay work as per the Schedule of Charges which may be obtained on application.

## Temiskaming Testing Laboratories

The Department maintains, at Cobalt, an ore sampling and testing laboratory which is now prepared to receive parcels of gold ore from 100 pounds upward, and after sampling and assaying the same to pay to the shipper the value thereof, less treatment charges. The purpose is to afford a market for ores extracted by prospectors and others in developing their mining claims, enabling them to obtain funds which they can use for further work and to report on the most satisfactory method of treatment. Fuller information may be obtained on application to the Manager, Temiskaming Testing Laboratories, Cobalt, Ontario.

## Publications.

For list of publications, illustrated reports, geological maps and mining laws, apply to

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# PROVINCE OF QUEBEC

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The holder of the certificate may stake mining claims to the extent of 200 acres.

**WORKING CONDITIONS.** During the first six months following the staking of the claim, work on it must be performed to the extent of at least twenty-five days of eight hours.

**SIX MONTHS AFTER STAKING.** At the expiration of six months from the date of the staking, the prospector, to retain his rights, must take out a mining license.

**MINING LICENSE.** The mining license may cover 40 to 200 acres in unsurveyed territory. The price of this license is Fifty Cents an acre per year, and a fee of \$10.00 on issue. It is valid for one year and is renewable on the same terms, on producing an affidavit that during the year work has been performed to the extent of at least twenty-five days' labour on each forty acres.

**MINING CONCESSION.** Notwithstanding the above, a mining concession may be acquired at any time at the rate of \$5 an acre for SUPERIOR METALS, and \$3 an acre for INFERIOR MINERALS.

The attention of prospectors is especially called to the territory in the North-Western part of the Province of Quebec north of the height of land, where important mineralized belts are known to exist.

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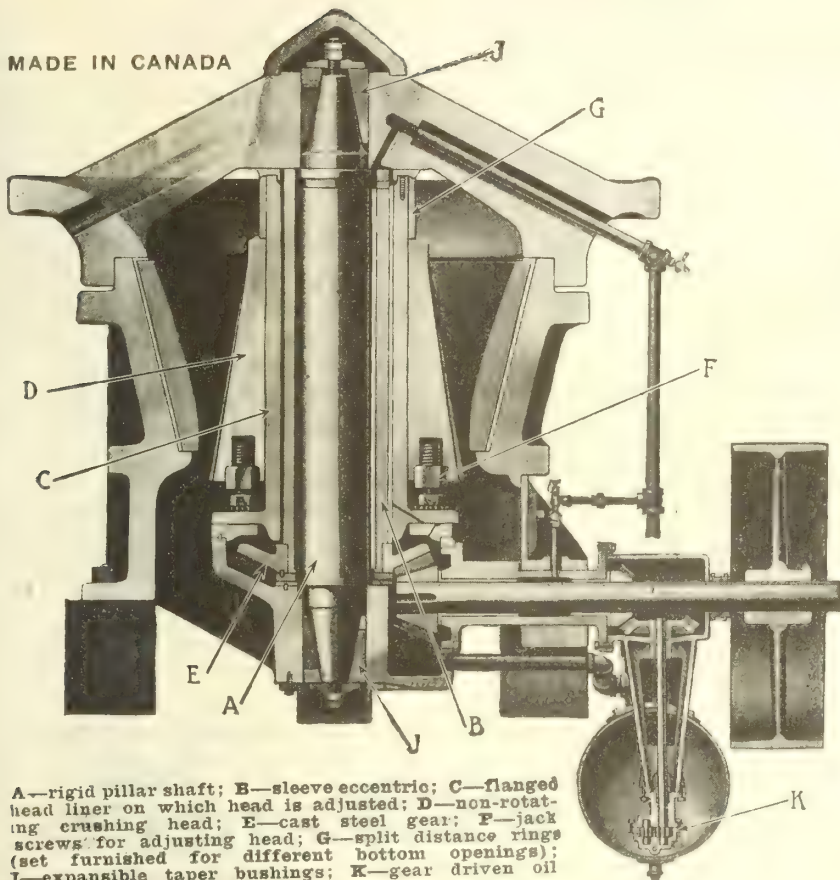
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The crushing stroke is a horizontal gyratory movement which cracks the rock without grinding action on the head or concave surfaces. The head cannot turn on head liner yet is readily adjusted by jack screws.

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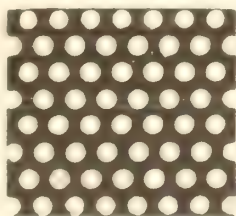
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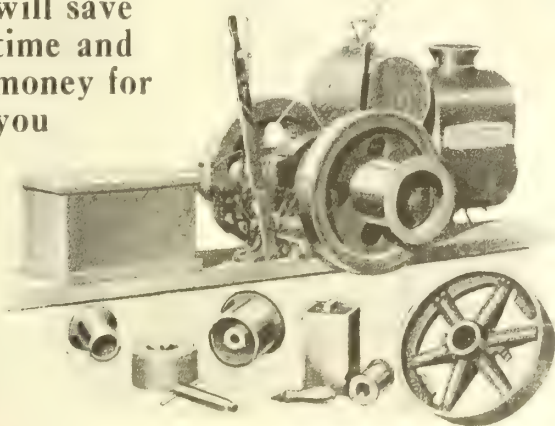
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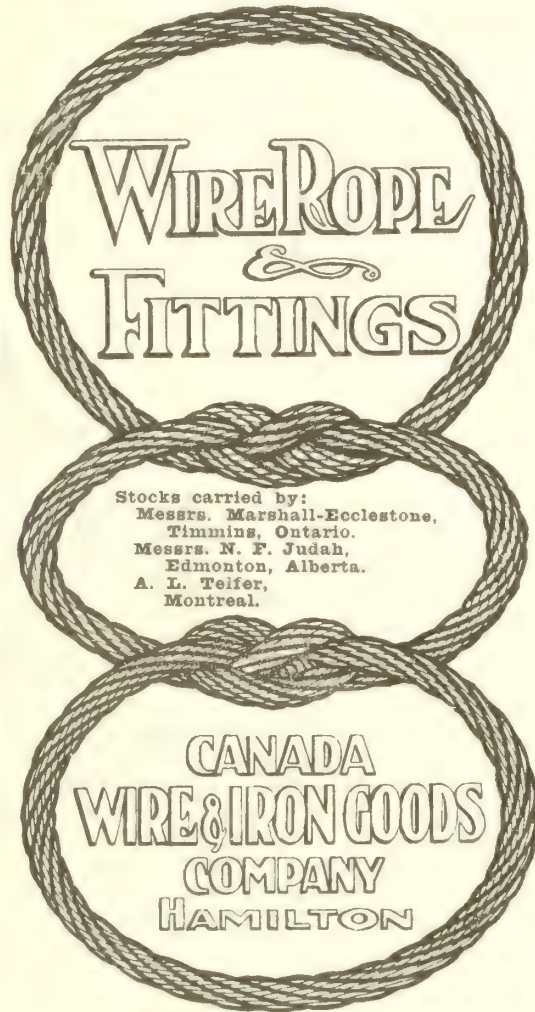
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# Canadian Mining Journal

PUBLISHED WEEKLY

Devoted to the Science and Practice of Mining, Metallurgy and the Allied Industries; and more particularly to their progress in Canada

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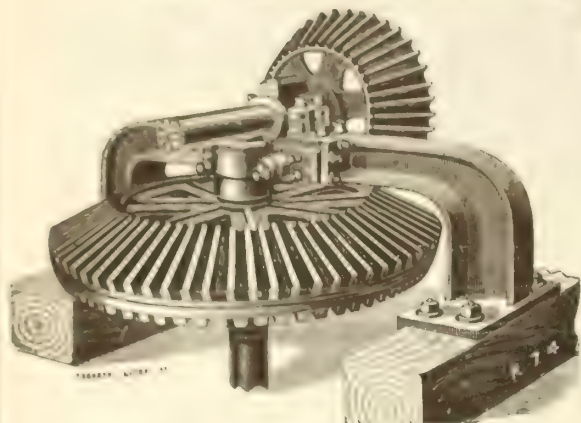
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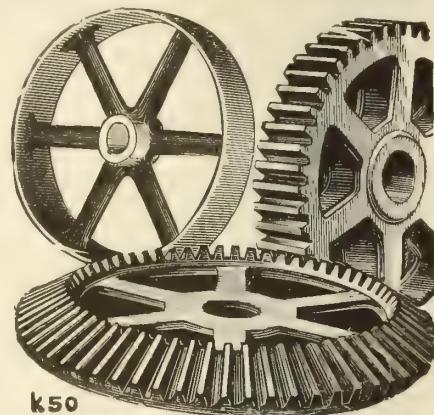


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# -:- EDITORIAL -:-

## THE NEW YEAR

The past year has been fruitful of beneficent results to the mining industry of Canada. The most remarkable of these are intangible, though plainly evident.

Throughout the year there have been unmistakable manifestations of a new and stronger consciousness, let us call it "class consciousness" for lack of a better phrase, in the men behind the industry. There is little, however, of the self-seeking that is always implied in that objectionable phrase. Honest, earnest, and disinterested citizens have striven diligently for the welfare of the profession of mining engineering, and for the advancement of the industry. That their striving has borne fruit is apparent in more than one direction.

The interest displayed by the Dominion Government, through the Deputy Minister of Mines, Dr. Charles Camsell, in investigating the overseas markets for Canadian mineral products, is a pleasing sign of vitality. We hope that it will lead either to an extension of the usefulness of the Mines Branch, or to a permanent organization the sole purpose of which would be to stimulate our export trade.

Of the conjoint efforts of the Dominion and Ontario Governments to promote the utilization of peat we can speak only with the warmest commendation. It is to the credit of both Governments that the work was undertaken. That they were incited thereto by sound prevision, and not by popular demand, is all the more creditable. Peat, that "moss-born jewel", as the ardent poet puts it, is assuredly to become the future domestic fuel of the greater part of Quebec and Ontario. The case may be taken as proven.

Concerning the Dominion Government's lignite briquetting plant in Saskatchewan we have heard little. Progress made in other countries since the inception of this enterprise amply attests its utility. The public positively requires education as regards the new science of fuel economy. Only by this means will the Government's technical departments win the support that they deserve.

The renewed attempt of the Ontario Government, inspired by the Hon. Mr. Mills, Provincial Minister of Mines, to discover a tonic for the iron industry of the Province is praiseworthy. Its efficacy remains to be demonstrated.

Each of these movements is significant; together they presage the rapidly approaching day when governments will put their shoulders to the wheel of pro-

gress and furnish constructive and continuous assistance to the discovery and appraisal of mineral deposits in every part of Canada.

The Canadian Institute of Mining and Metallurgy is approximating, year by year, more closely to the representative society that was the ideal of its founders. The Institute has weathered many a gale. Whatever troublous times may be ahead, there need be no fear as to its survival, so long, that is, as it lives within its income. Perhaps a New Year's resolution is in order.

As indicated by several articles appearing in this issue, mining and metallurgical progress in Canada has been sound and satisfactory during the past twelve months. No country can ever be self-contained or self-sufficing in relation to scientific and technical growth. In these matters the comity of nations engenders an admirable spirit of mutual helpfulness that is the antithesis of commercialism. It is pleasant to know that Canada is now on an equal footing with her sister nations in the World Exchange of scientific thought and technical achievement.

It is noticeable that the larger Canadian mining corporations are devoting much more effort and money to the search for payable ore deposits than ever before. Moreover, the fact that Canada offers a plethora of inducements to the investor is impressing itself more and more effectively upon the responsive minds of British and United States investors. There is more than mere rhetoric in this statement. It is within the bounds of accurate statement to assert that never in Canada's history has so much outside money been available for the development of her mining industry.

A new spirit is immanent in Canadian mining. Mining is not any more a thing to be apologized for. It has become a respectable industry, conducted on business principles. The mining man resents the activities of the charlatan more deeply and more promptly than anyone else resents them. Mining has been made a clean business in Canada, and a clean business it will remain. And much was done to foster this cleanliness during the year 1922. *The Canadian Mining Journal* will continue to make war upon all enterprises that savour of unfairness to the investing public.

\* \* \*

As the Old Year passes and the New Year dawns, *The Canadian Mining Journal* extends to its readers the heartiest good wishes. May peace and prosperity be the portion of each and all during the Year of Our Lord, Nineteen Hundred and Twenty Three.



## OUR REVIEWS

A review is essentially retrospective. A study of the past is, however, mainly profitable as it bears on action in the present and future. It is this point of view that has induced us to devote the present number of *The Canadian Mining Journal* to the results attained in our wide-spread mineral districts during the past twelve months.

The record is, in general, a pleasant one to contemplate, in spite of the disturbing influences of a world still turbulent and distracted and of a native citizenry not yet firmly settled in peaceful pursuits.

Mr. S. J. Cook, whose prompt reports at intervals throughout the year have kept the public in touch with the march of events in the mining industry, demonstrates a satisfactory growth in the Dominion's total for the year. His separate report on coal emphasizes the fact that this much-discussed product of the mines is the most important single item in our material civilization.

Mr. Thomas W. Gibson, a veteran of the mining industry in Ontario and one of its leading spirits, gives his usual vivid account of what the premier mineral province has contributed during the year. Particularly satisfactory is his reference to the proved continuity of the northern gold deposits and the hope for their extension still further, both vertically and longitudinally. He renews the emphasis laid by the provincial geologists upon the proved geological associations of the gold, which constitutes a word to the wise. The whole review has a distinctly forward look.

The record for British Columbia shows steady progress, which promises to be even more substantial during 1923. While a few outstanding properties have furnished the bulk of the output, there is a multitude of the lesser producers that have proved through years to be such an important factor in the province's mineral industry.

Quebec's mineral production still depends mainly, as heretofore, upon asbestos. But Mr. Theo. C. Denis, the chief public protagonist of the province's mineral industry, is able to record this year the commencement of what promises to be a gold mining industry of first-rate dimensions. If this development continues to the point of substantial production, the new year will see a general interest in Quebec's mineral resources that has never yet been accorded them.

Nova Scotia mineral production, still dependent almost exclusively upon coal, is gauged in a critical way by Mr. F. W. Gray, one of Canada's foremost authorities on coal. His hopeful view is certainly not tinged with undue optimism, and augurs well for the future. Mr. Beveridge's hopes for the province's gold industry are not without substantial foundation, and their realization is long overdue.

The infant mining industry in Manitoba has been almost strangled by the weight of illicit script hung about it; but it promises to survive this untoward and

illogical treatment, and to fulfil its first promise, according to Dr. J. S. DeLury, who knows well the several fields.

In addition to these records from the geographical divisions of the Dominion, we have four general reviews. Mr. Alexander Gray presents a study of the trend of investment in mines during the year. Comparatively few realize the position of prime importance held by sound, well-directed investment in the mining industry. Organized and logical investment in mines has been the last of the phases of the industry to receive consistent attention. It is still far from being in a satisfactory state, and deserves the closest attention of those directing the industry's destinies.

The current technique of Canadian mining and metallurgy is reviewed by Professors Graham and MacKay, both of them practical technologists whose experience in mine and mill gives them not only a comprehension of the technical man's problems and difficulties, but a full appreciation of the results attained.

Mr. Malcolm's duties throughout the year keep him in intimate touch with what our geologists have accomplished. Therefore his discriminating comment on results for 1922 is worth close attention.

We have asked Mr. N. B. Davis to review the position of Canada's Ceramic industry for this issue, not because of its present relative importance, but because it presents opportunities for development and expansion of which few are aware. The ceramic industries deserve much more attention than they are receiving at present. They are "prosaic", to be sure, but highly important.

## THE NEW YEAR

This is the time of moral restitutions  
Which take the form of penal resolutions.

\* \* \*

For every sin wherewith my scroll is blackened,  
For every day my stern control has slackened,  
For every time—I tell the country all—  
That I have visited old Montreal,  
I'll make a vow, to be observed and kept:  
Not like last year's, to fade away unwept.  
I vow I'll lead a blameless life and quiet,  
Forgoing all that makes for noise and riot;  
Subscriptions that I've owed the Journal, lo,  
These many years, I'll pay, don't say me no!  
I'll go to church on Sundays with the best,  
And through the year I'll stand the acid test.  
Though all the hosts of Satan tempt me sore,  
Unhesitant I'll show them to the door.

\* \* \*

On looking up my diary I see  
That last year's resolutions—woe is me!—  
Were word for word the duplicates of these:  
But I'm in earnest now—believe me—please!

J. C. M.

# Mineral Production of Canada in 1922

By S. J. COOK \*

The value of the mineral production of Canada in 1922 has been estimated at \$18,622,000 as compared with \$174,315,653 in 1921. The past year's output was made up as follows: metallics, \$61,731,000; non-metallics \$83,891,000; structural materials and clay products \$35,000,000.

The output of gold, silver and lead was greatly increased, and the recovery in the production of copper and nickel during the latter part of the year was most encouraging and fair gains were made. The slight decrease in coal was accounted for by labor conditions.

Comparative statistics of the value of the mineral production for the past ten years are given below:

Annual Values of Metallic and Non-Metallic Production

| Year           | Metallic    | Non-Metallic                  |                                              | Total       |
|----------------|-------------|-------------------------------|----------------------------------------------|-------------|
|                |             | Fuels and other non-metallics | Structural or clay and stone quarry products |             |
| 1913 . . . . . | 66,361,351  | 48,463,709                    | 30,809,752                                   | 145,634,812 |
| 1914 . . . . . | 59,386,619  | 43,373,571                    | 26,009,227                                   | 128,863,075 |
| 1915 . . . . . | 75,814,841  | 43,373,571                    | 17,920,759                                   | 137,109,171 |
| 1916 . . . . . | 106,319,365 | 53,414,983                    | 17,467,186                                   | 177,201,534 |
| 1917 . . . . . | 106,455,147 | 63,354,363                    | 19,837,311                                   | 189,646,821 |
| 1918 . . . . . | 114,549,152 | 77,621,946                    | 19,130,799                                   | 211,301,897 |
| 1919 . . . . . | 73,262,793  | 76,002,087                    | 27,421,510                                   | 176,686,390 |
| 1920 . . . . . | 77,939,630  | 108,027,947                   | 41,892,088                                   | 227,859,665 |
| 1921 . . . . . | 49,343,232  | 87,833,161                    | 35,139,260                                   | 174,315,655 |
| 1922 . . . . . | 61,731,000  | 83,891,000                    | 35,000,000                                   | 180,622,000 |

The outstanding feature of the metal production was the excellent gain made in the output of gold by the two important producing provinces, Ontario and British Columbia. The total gold production for Canada during the year amounted to more than 1,200,000 ounces and compared with the 1921 production showed an increase of 31.0 per cent. The increased prices and the lively markets for silver and lead were reflected in excellent gains in production. Zinc production remained about the same. Cobalt increased slightly most of the gain being made in the latter part of the year, while copper and nickel as might have been expected, declined appreciably.

Although the production of copper for the first six months showed a decrease from the output of the corresponding period in the preceding year, the loss was more than overcome during the later months and copper shows a creditable increase in the annual estimate now reported. This gain was wholly due to the resumption of nickel-copper smelting activities.

Although the smelter production of blister and converted copper in British Columbia was less than in 1921 the recovery and rise in the price of copper did not occur until about the middle of the year and some important copper mines which were active in 1921 did not appear on the shipping list in 1921 until nearly the close of the year. The last half of the year shows a decided improvement in the copper industry and 1923 will likely show a considerable resumption of activity in this field.

The inactivity of the smelting departments of the

\* Chief of the Mining, Metallurgical and Chemical Branch, Dominion Bureau of Statistics.

International Nickel Company in the earlier part of the year and of the British America Nickel Corporation throughout the entire year accounted for the small production of nickel. The accumulated stocks of nickel have now been fairly well absorbed and the immediate future is much brighter than any time during the past two years.

Among the non-metallics the output of coal, considering the great loss of time through strikes, was most encouraging. Asbestos shipments during the latter part of the year were considerably increased and while the producing mines operated on a much reduced scale as compared with two years ago, conditions were such towards the end of the year that the



HON. CHARLES STEWART  
Federal Minister of Mines

miners were assured of work in the coming months and the fear of the repetition of the unemployment that prevailed last winter was reduced to a minimum.

The ten principal products of the mineral industry in Canada in 1922 in order of the values assigned were: coal \$68,349,500; gold \$25,110,500; silver \$16,633,500; nickel \$8,684,000; copper \$6,832,800; lead \$6,141,553; asbestos \$5,200,000; natural gas \$4,688,400; zinc \$3,091,500; and salt \$1,850,000.



### Coal

The output of coal from Canadian Mines during the twelve months of the calendar year 1922 was approximately 14,210,000 tons at an estimated value of \$68,349,200 as compared with 13,057,493 tons, valued at \$72,451,066 in 1921, 16,046,764 tons valued at \$82,496,538 in 1920, and 13,919,096 tons valued at \$55,622,670 in 1919. The coal statistics for the year are covered by a separate statement on another page.

### Gold

The remarkable prosperity of the gold mining industry during the year just closed was the most outstanding feature of the year's production. The 1,200,000 ounces production speaks for itself. Although the mineral resources of Ontario have been pretty thoroughly known for more than twenty years the development of the gold reserves first noted in 1909 did not extend to profitable commercial production until about 1912. The war restricted expansion and although in the post-war period the favorable exchange situation contributed to the advance of the industry, it was not until 1922 that the full stride of production was obtained and the million-ounce annual output definitely accomplished. A continued steady increase in production may be expected. The gains in 1922 were due to the steady development of the Northern Ontario gold mines, with Hollinger holding not only first place in Ontario but first place among the gold producing mines of the world. McIntyre-Porcupine and Dome were close contestants throughout the year for second place. A great amount of development work was carried on and the list of producing mines was lengthened.

In British Columbia the increase was also marked and although one of last year's producers, the Nugget Mine was closed throughout the year the provincial output was increased by the re-opening of the Nickel Plate mine owned by the Hedley Gold Mining Co., which had been idle throughout 1921, and by the phenomenal production from the Premier Mine near Stewart. Throughout the year the Premier Mining Company shipped each month about 3,000 tons of high-grade ore running in the neighborhood of \$80 a ton and 3,000 tons of medium grade averaging \$35 per ton. It milled between 3,000 and 4,000 tons of lower grade ore in its own concentrating and cyanide plant and it has been estimated that the mine has been turning out ore to the value of \$400,000 each month, the high-grade and concentrate going to the Tacoma, Wash., smelter and the medium and lower grade ores going to the Granby smelter at Anyox, B.C.

Reports from all the gold fields indicated wonderful activity in every camp.

### Silver

The production of silver continued favorably in spite of the prevailing medium price for the metal, and amounted in all to 15,726,000 ounces valued at \$10,633,500 for the year. As compared with the figures for a year ago there was an increase of more than two million ounces. The producing areas in order of importance were Ontario, British Columbia and the Yukon. Quebec and Manitoba did not produce silver in any great amount during the period, and Nova Scotia contributed only the few ounces contained in gold bullion shipped to the Royal Mint. In the Cobalt

area both the Nipissing and the Mining Corporation increased their production of silver bullion, as did also the O'Brien and Coniagas Mines. In British Columbia the greatest increase was made in the Skeena district and was accounted for by new shippers, the most important of which was the Premier. The recovery in the Slovan district, where mining in 1921 was retarded because of the reduced market value of silver and its associated metals, was apparent, with a much brighter future in view. A considerable portion of this activity should probably be credited to the new schedule of rates offered by the Consolidated Mining and Smelting Company, to operators producing silver-lead-zinc ores.

### Lead

More lead was produced in Canada during the first half of the year just closed than in the entire twelve months of the preceding year. The output in 1922 from all sources amounted to 98,738,000 pounds having an estimated value of \$6,141,000 as against the previous year's production of 66,679,000 pounds valued at \$3,828,000.

The most outstanding development was the increased production of lead by the Trail smelter. Receipts at the Trail smelter during the last few months of the year were in excess of the records for any previous period in the company's history. The output from the Galletta smelter in Ontario was maintained at about the same level as in the preceding year, and a small quantity of lead was also produced at Notre-Dame des Anges in Quebec.

The price of lead showed a gradual recovery during 1922 from the low average on the St. Louis market of 4.363 cents per pound in 1921 and reached a high of 6.868 cents a pound on the same market in November. The Montreal price of lead averaged 5.742 cents a pound in 1921 and 6.22 cents in the year just closed.

### Natural Gas

The output of natural gas from Canadian fields in 1922 amounted to about 15,000,000 thousand cubic feet valued at \$4,689,000. The quantity of gas produced was practically unchanged from the output in the preceding year, but the value in 1922 was approximately \$300,000 less.

Ontario retained the premier position and produced 8,600,000 thousand cubic feet while Alberta followed with an output of 5,500,000 thousand cubic feet. More than 900,000 thousand cubic feet was produced from the fields of New Brunswick.

### Copper

The production of copper in Canada since the close of the war has been only slight. The output during the first half of 1922 declined considerably below the production during the corresponding period of the previous year, but the resumption of operations by the nickel-copper smelters resulted in the annual production for 1922 rising about 3,500,000 pounds over the record for the preceding year. During the last six months of 1922, the nickel-copper smelters in Ontario produced more than 18,000,000 pounds of copper contained in matte. The production in British Columbia in the earlier part of the year was considerably handicapped by the high cost of fuel at the Trail smelter. The Granby Company at Anyox operated steadily throughout the year.

The rise in the price of copper that set in towards



the latter part of April proved an incentive to production and electrolytic copper in New York, averaging 13.338 cents per pound for the twelve months of 1922, was nearly eight-tenths of a cent above the 1921 average price.

### Asbestos

Asbestos mining in Quebec, in common with the other asbestos producing countries of the world, suffered a decline in 1921 which continued throughout the first half of 1922. During the past few months, however, there has been a considerable revival in this industry, and prospects are much better now than they have been at any time within the past two years.

The reduction in the percentage of royalty taxes imposed by the Provincial Government on all asbestos produced and sold will undoubtedly prove quite a stimulus to the industry as a whole. The manufacture of finished asbestos product is being looked forward to as a coming important industry in the Province of Quebec.

Two plants are presently supplying the local demand for asbestos papers, shingles and brake linings, but it has recently been announced that other companies will shortly enter this field. It is reported that a representative of one of the largest asbestos companies in England has been in Canada studying conditions and that if the negotiations now under way are carried to a successful conclusion, the capitalization of the companies engaged in this field will be more than doubled.

The output of asbestos in 1922 reached a total of approximately 139,000 tons of all grades, valued at \$5,200,000 as compared with 92,761 tons valued at \$4,906,230 in 1921. The appreciable percentage increase in production has been due almost entirely to the activity about the mines during the past three months.

### Zinc

The smelter recovery of zinc in 1922 was approximately one million pounds greater than in the preceding year and amounted in all to 54,000,000 pounds valued at \$3,092,000. As in other years the production was derived entirely from British Columbia and was derived almost exclusively from the Trail smelter.

The production of zinc by small operators in the past has progressed under many difficulties. Where a Slocan mill, for instance, produced both lead concentrate and zinc concentrate, it could readily market the lead concentrate, but there was more difficulty in disposing of the zinc product. Zinc ores and concentrates were formerly exported at heavy cost in freight and duty to United States smelters. The operators were recompensed for the zinc contents but lost valuable amounts of silver, and were penalized for any lead present. On the other hand, lead ores and concentrates containing considerable zinc proved very refractory when treated in the lead smelters in Canada, and as a result mine operators suffered a penalty per unit of zinc in their ores. Under these conditions zinc mining was handicapped and could not flourish except under such conditions as obtained in the late war. By the introduction of improvements in the electrolytic process carried on by the Consolidated Mining and Smelting Company it has been found possible to offer a schedule of smelter rates under which the mine operator will be enabled to market zinc ores and concentrates and receive payment for a considerable portion of the precious metal contents in addition to the zinc. While

zinc contained in lead ores may continue to be a loss, the penalty will be lowered and it is expected that the lead-zinc industry will benefit materially.

### Non-Metallics

Feldspar mining in the Province of Quebec has been growing apace during the last two years. The industry, which is an old one in the province, was given a great impetus by the discovery of a large body of cream, white orthoclase feldspar in Derry Township in the fall of 1920. From this deposit nearly 10,000 tons of high grade potash feldspar was shipped during 1921 and production during the past year has been well maintained. Interest in the production of feldspar has been marked, particularly during recent months.

The output of gypsum also showed a considerable improvement over the records of the preceding year and amounted in all to 429,000 tons valued at \$1,800,000 as compared with an output in 1921 of 386,000 tons valued at \$1,785,538.

\* \* \*

The increase in the production of metals during the past year amounting to approximately \$12,000,000 in value marked a resumption of progress in the metal mining field and points the way to greater prosperity. The slight decline in the production of non-metallic including coal amounts only to about \$4,000,000 in value and since the greater part of this decrease was due to loss of production caused by labour troubles, the slight set-back may be regarded as negligible. In the successful marketing of structural materials and clay products the revival of the building industry has played a great part and during the past year the production of these materials has been considerably increased; but owing to the fact that prices have at the same time declined, the value of the output in 1922 was only maintained at about the same level as in 1921.

The advance in mineral production as a whole, then, to a total value of \$180,622,000 may be considered as most propitious. Comparison with preceding years shows that 1920, 1918 and 1917 were the only years in which this value was exceeded.

Taken all in all the mining industry in Canada may be regarded as in a sound financial and industrial condition, with a bright future immediately ahead of it.

### COAL IN CANADA, 1922

BY S. J. COOK\*

#### Output

The output of coal from Canadian mines during the twelve months of the calendar year 1922 was approximately 14,210,000 tons as compared with 15,057,493 tons in 1921; 16,946,764 tons in 1920; and 13,919,096 tons in 1919. The great strike that tied up the United States coal mines for several months was reflected in Canada and resulted in a loss of 1,199,427 working days. Eleven disputes between employees and employers occurred in the coal mining industry in Canada during the eleven months ending November, nine of which were in Alberta and South-eastern British Columbia, and the other two in Nova Scotia. In all 23,901 men were effected, and of the time lost, 931,960 days were lost in the strike which began on April 1st, and 260,034 days time was lost in the short strikes originating in August. Having

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in mind the fact that over one million working days that was lost by the employees of the coal mining industry during the year, the output of fourteen and one quarter million tons may be considered quite satisfactory. Alberta coal mine output amounted to 5,387,000 tons, a little more than half of which was lignite and made up the balance bituminous. Nova Scotia contributed 5,349,000 tons and occupied second place among the coal-producing provinces. British Columbia amounted for 2,936,000 tons, and New Brunswick and Saskatchewan followed with 287,000 tons and 250,000 tons respectively.

#### Interprovincial Shipments of Canadian Coal

Four million tons of Canadian coal moved in interprovincial trade during the year and of this amount about 2,443,000 tons was bituminous coal, the balance being mostly lignite. Shipments of Nova Scotia coal to other Canadian provinces, principally New Brunswick, Prince Edward Island and Quebec, amounted to almost 2,000,000 tons. The province of Quebec received about 1,600,000 tons of Canadian coal during the year, an increase of nearly 700,000 tons above the receipts of Canadian coal in the preceding year and fully six times as much as reached this province in 1920.

COAL MADE AVAILABLE FOR CONSUMPTION IN 1922 BY PROVINCES SHOWING THE OUTPUT, EXPORTS INTERPROVINCIAL SHIPMENTS AND IMPORTS FROM THE UNITED STATES AND GREAT BRITAIN

| Province                            | Output     | Canadian Received from other Provinces | Coal Shipped to other Provinces | Exported  | Imported From United States | Great Britain | Coal Available for Consumption |
|-------------------------------------|------------|----------------------------------------|---------------------------------|-----------|-----------------------------|---------------|--------------------------------|
| <b>Nova Scotia:—</b>                |            |                                        |                                 |           |                             |               |                                |
| Anthracite .....                    |            |                                        |                                 |           | 23,642                      | 3,965         | 27,607                         |
| Bituminous .....                    | 5,348,830  | 61                                     | 1,981,384                       | 623,416   | 6,233                       | 3,267         | 2,753,591                      |
| Total .....                         | 5,348,830  | 61                                     | 1,981,384                       | 623,416   | 29,875                      | 7,232         | 2,781,198                      |
| <b>New Brunswick:—</b>              |            |                                        |                                 |           |                             |               |                                |
| Anthracite .....                    |            |                                        |                                 |           | 43,444                      | 22,144        | 65,588                         |
| Bituminous .....                    | 288,656    | 359,232                                | 63,180                          | 63,901    | 61,501                      | 25,268        | 607,576                        |
| Total .....                         | 288,656    | 359,232                                | 63,180                          | 63,901    | 104,945                     | 47,412        | 673,164                        |
| <b>Prince Edward Island:—</b>       |            |                                        |                                 |           |                             |               |                                |
| Anthracite .....                    |            |                                        |                                 |           | 5,989                       |               | 5,989                          |
| Bituminous .....                    |            | 80,422                                 |                                 |           | 1,355                       |               | 81,777                         |
| Total .....                         |            | 80,422                                 |                                 |           | 7,344                       |               | 87,766                         |
| <b>Quebec:—</b>                     |            |                                        |                                 |           |                             |               |                                |
| Anthracite .....                    |            |                                        |                                 |           | 835,290                     | 137,109       | 972,399                        |
| Bituminous .....                    |            | 1,594,458                              |                                 | 56,403    | 1,264,570                   | 674,593       | 3,477,185                      |
| Total .....                         |            | 1,594,458                              |                                 | 56,403    | 2,099,860                   | 811,702       | 4,449,617                      |
| <b>Central Ontario:—</b>            |            |                                        |                                 |           |                             |               |                                |
| Anthracite .....                    |            |                                        |                                 |           | 1,715,071                   | 900           | 1,715,971                      |
| Bituminous .....                    |            | 10,424                                 |                                 |           | 8,115,536                   | 6,929         | 8,132,889                      |
| Total .....                         |            | 10,424                                 |                                 |           | 9,830,607                   | 7,829         | 9,848,860                      |
| <b>Head of Lakes:—</b>              |            |                                        |                                 |           |                             |               |                                |
| Anthracite .....                    |            |                                        |                                 |           | 43,816                      |               | 43,816                         |
| Bituminous .....                    |            | 635                                    |                                 | 75        | 1,722,836                   |               | 1,723,396                      |
| Lignite .....                       |            | 19,333                                 |                                 |           |                             |               | 19,333                         |
| Total .....                         |            | 19,968                                 |                                 | 75        | 1,766,652                   |               | 1,786,545                      |
| <b>Manitoba and Head of Lakes:—</b> |            |                                        |                                 |           |                             |               |                                |
| Anthracite .....                    |            | 10                                     |                                 |           | 15,223                      |               | 15,233                         |
| Bituminous .....                    |            | 141,409                                |                                 | 2,079     | 70,174                      |               | 209,504                        |
| Lignite .....                       |            | 440,254                                |                                 |           |                             |               | 440,254                        |
| Total .....                         |            | 581,673                                |                                 | 2,079     | 85,397                      |               | 664,991                        |
| <b>Manitoba and Head of Lakes:—</b> |            |                                        |                                 |           |                             |               |                                |
| Anthracite .....                    |            | 10                                     |                                 |           | 59,039                      |               | 59,049                         |
| Bituminous .....                    |            | 142,044                                |                                 | 2,154     | 1,793,010                   |               | 1,932,900                      |
| Lignite .....                       |            | 459,587                                |                                 |           |                             |               | 459,587                        |
| Total .....                         |            | 601,641                                |                                 | 2,154     | 1,852,049                   |               | 2,451,536                      |
| <b>Saskatchewan:—</b>               |            |                                        |                                 |           |                             |               |                                |
| Anthracite .....                    |            | 796                                    |                                 |           | 231                         |               | 1,027                          |
| Bituminous .....                    |            | 198,282                                |                                 | 5,167     | 1,404                       |               | 194,519                        |
| Lignite .....                       | 249,559    | 1,068,330                              | 97,221                          |           |                             |               | 1,220,668                      |
| Total .....                         | 249,559    | 1,267,408                              | 97,221                          | 5,167     | 1,635                       |               | 1,416,214                      |
| <b>Alberta:—</b>                    |            |                                        |                                 |           |                             |               |                                |
| Anthracite .....                    | 41,423     |                                        | 2,034                           |           |                             |               | 39,389                         |
| Bituminous .....                    | 2,511,759  | 15,918                                 | 313,303                         | 821       | 1,130                       |               | 2,214,693                      |
| Lignite .....                       | 2,834,077  | 1,064                                  | 1,513,654                       |           |                             |               | 1,321,487                      |
| Total .....                         | 5,387,259  | 16,982                                 | 1,828,991                       | 821       | 1,130                       |               | 3,575,559                      |
| <b>B. C. and Yukon:—</b>            |            |                                        |                                 |           |                             |               |                                |
| Anthracite .....                    |            | 1,228                                  |                                 |           | 35                          |               | 1,263                          |
| Bituminous .....                    | 2,935,579  | 41,978                                 | 84,919                          | 1,069,435 | 9,899                       |               | 1,833,102                      |
| Lignite .....                       |            | 81,861                                 |                                 |           |                             |               | 81,861                         |
| Total .....                         | 2,935,579  | 125,067                                | 84,919                          | 1,069,435 | 9,934                       |               | 1,916,226                      |
| <b>Canada:—</b>                     |            |                                        |                                 |           |                             |               |                                |
| Anthracite .....                    | 41,423     |                                        |                                 |           | 2,682,741                   | 164,118       | 2,888,282                      |
| Bituminous .....                    | 11,084,324 |                                        |                                 | 1,821,297 | 11,254,638                  | 710,057       | 21,228,222                     |
| Lignite .....                       | 3,083,636  |                                        |                                 |           |                             |               | 3,083,636                      |
| Total .....                         | 14,209,883 |                                        |                                 | 1,821,297 | 13,937,379                  | 874,175       | 27,200,140                     |

The restoration of the St. Lawrence trade to the normal pre-war figure of 2,000,000 tons per season was therefore almost overtaken during the twelve months just closed. Shipments of Canadian coal into the province of New Brunswick totalled 360,000 tons, while the shipments from that province to other points in Canada amounted to 63,000 tons. Only about 10,000 tons of Canadian coal was shipped into Central Ontario during the year. Manitoba and the section of Ontario lying west of Fort William and Port Arthur received approximately 600,000 tons. Saskatchewan's receipts of Canadian coal were about 1,267,000 tons, while the shipments from that province for domestic trade were slightly under 100,000 tons. Alberta coal to the extent of 1,829,000 tons found its way to other Canadian provinces and 85,000 tons of British Columbia coal was also shipped for consumption in other parts of Canada.

### *Exports*

Exported Canadian coal amounted to 1,821,000 tons for the year, comprising about 1,000,000 tons from the western provinces and the balance from the maritime provinces. In spite of the strike the amount of Canadian coal exported during the twelve months ending December, 1922, was only about 160,000 tons less than in the preceding year. The exports during 1920 were 2,538,000 tons, and in 1919 amounted to about 2,000,000 tons.

### *Imports*

For the first time in many years quantities of coal were imported from Great Britain and in all about 874,000 tons was received, 710,000 tons of which was bituminous and 164,000 tons of which was entered as anthracite. The receipts at customs ports in Quebec of this coal from Great Britain amounted to 812,000 tons during the year while New Brunswick received 47,000 tons and the balance was equally divided between Ontario and Nova Scotia. Imports of coal from the United States amounted in all to 13,937,000 tons, comprising 11,255,000 tons of bituminous coal and 2,683,000 tons of anthracite coal. As compared with the records for the preceding year the imports of bituminous coal were 2,300,000 tons lower, and the imports of anthracite were 1,885,000 tons less. Comparison with 1920 figures would indicate an even greater shortage, as the imports of United States bituminous coal in that year were close to 16,000,000 tons and the anthracite imports came very near 5,000,000 tons.

### *Coal Made Available for Consumption in Canada*

The table shows the output, interprovincial movements, exports for foreign trade and imports for domestic consumption of anthracite, bituminous and lignite coal for each province in Canada and from the data given there has been deduced the amount of coal made available for consumption in each provincial division. For the whole of Canada the apparent consumption, or more properly, the coal made available for consumption in 1922 amounted to 27,200,000 tons and included 21,228,000 tons of bituminous coal; 3,083,000 tons of lignite; and 2,888,000 tons of anthracite coal. The principal coal-consuming province, as indicated in the table, was Central Ontario in which 9,849,000 tons was made available, including 1,716,000 tons of anthracite coal. In 1921 the same area was supplied with 11,543,000 tons and in 1920 with 13,331,000 tons. For Quebec the data given show that 4,450,000 tons of coal was made

available in 1922 as compared with 4,898,000 tons in 1921, and 5,327,000 tons in 1920.

The output figures given in the table were reported by the companies operating producing mines. The data on interprovincial shipments were also compiled from monthly statements sent in by the coal operators. The imports and exports items were compiled from data supplied by the Department of Customs, and in the case of imports, the figures given show the total quantity of coal imported from the United States during the year. Distinction must be made between this record and the figures given in the table of imports "entered for consumption." The tonnages "entered for consumption" represent only coal actually cleared from Customs for consumption in Canada. It often happens that large quantities of bituminous coal are brought into Canada but are not cleared from Customs until required for use, owing to the fact that there is a duty of 53 c. a ton on all bituminous coal, round and run-of-mine, imported. The exports figures show the quantities cleared through Custom ports during the year. Coal mined in one province is sometimes shown as exported from another province, a notable instance being that the bulk of coal exported from the province of Alberta is shipped through the Customs ports of Fernie and Cranbrook, in British Columbia, while some Nova Scotia coal is exported through the port of St. John, New Brunswick.

The coal made available for consumption computed from the data referred to above, is shown for each province. Separate totals have been made for the ports at the Head of the Lakes, and as much of the coal received at the Customs ports of Fort William and Port Arthur finds its way into Manitoba, a separate total has been made to include the data for Manitoba and Head of the Lakes.

From the data available it appears that in 1920 Canada produced 16.9 million tons, exported 2.5 million tons, imported 20.8 million tons, and thus apparently consumed 35.2 million tons. In 1921 when the output was 15 million tons, the quantity exported amounted to 1.9 million tons, imports to 18.1 million tons, and the apparent consumption was 31.1 million tons. The decline in the consumption of coal in 1921 was in conformity with the prevalent depression in the industrial world. For 1922 the output was 14.2 million tons, the exports 1.8 million tons, the imports 13.9 million tons from the United States and 0.8 million tons from Great Britain, so that the apparent consumption was 27.2 million tons. The decrease in every item was due to the strikes prevailing during the year, although the apparent consumption of 27.2 million tons was also partly due to depressed industrial conditions. The output towards the close of the year was decidedly improved.

Canada has the largest mileage of railway per capita in the world, with 4.42 miles for each 1000 inhabitants. Next comes Australia, with 3.54 miles; Argentine, 2.66 miles; United States, 2.50. Britain has 0.52 miles per 1000 population, which is characteristic of the Continent as well.

Mr. C. St. Clair Parsons, formerly of Toronto, has removed to England where his address is c/o Post Office Buildings, Middlesbrough. He has recently returned from a professional visit to Spain, Morocco and Algeria on behalf of the Northern Mercantile and Investment Corporation, Middlesbrough, for whom he is Supervising Mining Engineer.



# The Year in Ontario

By THOS. W. GIBSON\*

There is every reason to be gratified with the position of the mining industry in Ontario at the close of 1922. The year saw an increased output of the four metals of chief production—gold, silver, nickel and copper. Promising discoveries continue to be made, and capital, both from United States and England, is more readily interested. Prospects for 1923 are bright.

## Gold

Dealing first with gold, the yield for the year was about \$11,000,000 as compared with \$11,624,085 for 1921, an increase of over 10 per cent. Every one of the producers at Porcupine materially bettered its record for 1921. The output of the Hollinger was about \$12,000,000 as against \$9,051,276 in 1921; of Dome about \$4,000,000 as against \$2,200,261 in 1921, and McIntyre about \$2,000,000 as against \$1,827,761. The giant Hollinger has increased its holdings by the purchase of the Schumacher property which adjoins it and contains 160 acres. The price paid was \$1,600,000. At Kirkland Lake, two of the four leading mines exceeded the previous year's output. Tech-Hughes' production in 1922 was 575,000 as against \$322,919 in 1921; Wright-Hargreaves \$750,000 as compared with \$468,751; while Lake Shore's yield of \$480,000 and Kirkland Lake's of \$210,000 respectively were each a little under that of the previous year. These decreases at Kirkland Lake were due to the power being cut off for a month by the destruction of the transmission line in the great fire of October.

Taking the producing camps of Porcupine and Kirkland Lake, two features stand out from the experience of 1922.

1. Gold values increase with depth, at any rate up to the limits yet reached, say 2,000 feet at Porcupine, and 800 feet at Kirkland Lake.

2. In both camps bold campaigns of development are being undertaken on the strength of deductions drawn from geological structures.

Recent explorations, as for instance in the McIntyre, have obtained remarkable results below the present workings, and there seems at present no reason to doubt that the mines both at Porcupine and Kirkland Lake may, notwithstanding increased production, go on year by year, increasing the amounts of ore in reserve. This affords the best of reasons for increasing their capacity for turning out bullion. In consequence, extensions are being planned to plants in both camps, and there can be little doubt that the production during the next two or three years will rise to a still higher point.

Northern Ontario mines are fortunate in being situated close to hydraulic power. The falls of the rivers running down the slopes of the northern and southern watersheds are being pressed into use for operating mills and mines. The latter share these natural assets with the pulp and paper industry, and it would appear that in some localities there is not much power remaining undeveloped. It is understood that the Hollinger mine, which now crushes 4,500 tons of ore daily, would increase its capacity to 7,000 tons per day, if assured of increased power supply. Two new hydro-electric power developments are under way, one at Sturgeon Falls on the Mattagami river, to generate 6,000 or 7,000 horse power, and one at Indian Chutes on the Montreal river, of like capacity. Some of this power at both places should be available by February.

## Outlying Gold Properties

In addition to the established camps of Porcupine and Kirkland Lake, other gold areas are in various stages of

development. These include Larder Lake, where the Crown Reserve has located promising bodies of ore, and Night Hawk Lake, where the Night Hawk Peninsular is developing a good prospect, and building a mill. The deposits at Matachewan have been largely marking time, awaiting the advent of power, which Indian Chutes will supply. The finds at Lightning River are promising enough to warrant further expenditures, which doubtless will be made. Transportation and other difficulties have beset the group at Shining Tree, but work was done at White Rock and some other properties. The fine surface showings in this camp warrant further testing. North of Lake Superior, the Goudreau has been sunk upon, and will be given a chance to prove its quality; there are also favourable developments on several mining claims south of Schreiber. Further to the west, the old Mikado mine on



MR. THOS. W. GIBSON  
Deputy Minister of Mines

Lake of the Woods and the Foley on Seine River, both long idle, are being put in shape for renewed operation.

C. W. Knight, Associate Provincial Geologist, points out in his report on Lightning River, that in northeastern Ontario there are two main belts that contain the most important gold mines in the Province. These belts are roughly parallel and 25 to 40 miles apart. The northern belt runs from the Dome mine at Porcupine, eastward for 16 miles, the last known outcrop being in German township. Further to the eastward for 27 miles the rocks are almost entirely drift-covered. Then there outcrops another belt of the sediments, about nine miles long, in the Croesus gold mine area. Eastward again for 22 miles, drift intervenes, until on the Lightning River favourable conditions again occur, and promising discoveries of gold have been made. The southern band includes Matachewan, Kirkland

\* Deputy Minister of Mines, Ontario.



Lake and Larder Lake, and extends to and across the Quebec border line. Each of these bands follows a belt of Timiskaming sediments, consisting of conglomerate, greywacke and slate. Intrusions of feldspar-porphry and quartz-porphry have played a great part in the deposition of the gold. J. H. Curle, an eminent English gold mining engineer, sums up the geological situation by stating that the ore bodies are found where conglomerate meets porphyry, and gives his opinion that, "always excepting the Rand," northern Ontario will be the world's best gold belt for the next 20 years. Confidence in this diagnosis, which is concurred in by the geologists employed by the mining companies themselves, has led to large sums being spent in prospecting the eastward extension of Kirkland Lake. So far no Hollingers or Domes have been found, but gold ore has been located in a number of places and it may well be that fortune will smile on some of the seekers for gold in eastern Kirkland.

#### *Silver*

The day of silver production is by no means over in Ontario. On the contrary, the output of the Cobalt camp for 1922 was about ten million dollars in value, as compared with \$8,412,059 in 1921. The average price of silver for the year was a little higher than in 1921, when it was 65.65 cents per ounce. The natural processes of consolidation in a camp of the age of Cobalt are under way, the smaller companies being absorbed by the larger ones. Mining Corporation, for instance, has acquired a large acreage in the neighborhood of the Keeley mine, having taken over among other claims those of the Frontier Mining Company and the Crompton property. Coniagas has leased the Beaver mine and the Badger, Prince and Davis properties adjoining. O'Brien, Limited, whose plant was destroyed by fire, has bought the mill of the Bailey property and will send its ore thither by aerial tramway for treatment.

South Lorrain is attracting much attention by reason of the remarkable recrudescence of the Keeley mine and the excellent results obtained by the Mining Corporation on the adjacent claims. The Keeley mine broke the Farmers' Bank and put its president in jail. When the bank's assets were sold, the Keeley was purchased for a song. J. Mackintosh Bell, manager of the English company that acquired the mine, sized up the mine's geological conditions and induced his company to sink. The result was the Woods vein proved to contain remarkably rich ore. The Keeley production for the year may be put at about \$800,000.

Nipissing, the leader of the Cobalt camp, maintains its position well, its production being a little under 4,000,000 ounces for the year. Mining Corporation comes next with 1,750,000 ounces. O'Brien and Coniagas follow with over 1,000,000 each. In Gowganda the chief producer remains Miller Lake-O'Brien, but its neighbor, Castle-Trethewey, has found good ore and may erect a small mill in 1923. Favourable developments have also taken place on Everett Lake.

Discoveries of argentiferous galena on Red Lake in the district of Patricia, north of the English river, created considerable interest last autumn. The veins appear to be narrow, but assays show high values in silver. The area is likely to be thoroughly prospected when the snow leaves next spring.

#### *Nickel-Copper*

The pace by which nickel mining is returning to normal quickens. The International Nickel Company begun work in the Creighton mine in August and blew in two converters at the Copper Cliff smelter, adding a third later in the year. The refinery at Port Colborne was opened on 1st. May. Henceforward, all nickel refined by this com-

pany will be produced at the Port Colborne plant, the works in New Jersey having been dismantled, the machinery sold, and the buildings torn down. Some of the nickel matte will continue to go to Huntington, West Virginia, for use in making Monel metal, the now well-known alloy of nickel and copper, whose production does not require separation of these metals from one another and which is coming increasingly into use for a large variety of purposes where toughness and resistance to corrosion are required. The Mond Company emptied its matte storage yards for the first time since the armistice. In fact, this company never actually stopped working, and is prepared to meet its share of the reviving demand for nickel and nickel products. The American Malleable Nickel Company has opened a plant at Clearfield, Pa., for the manufacture of malleable nickel, using the product of the Mond company. The Murray mine and Nickelton smelter of the British America Nickel Corporation, Limited, where idle during the whole year, but part of the refinery at Deschenes, Quebec, was in operation for a portion of the time. The nickel contained in the matte produced by the companies during the year was about 8,500 tons, an increase over 1921 of 1,000 tons. The copper output for the year, practically a by-product of nickel, was, say, 6,200 tons, also an increase over the production of 1921 by 1,000 tons.

#### *Iron*

The production of pig iron fell off during the year by over 100,000 tons, the output for the first nine months being 291,926 tons, as compared with 393,303 tons for the corresponding period in 1921. Very little Ontario iron ore is now being smelted, either in or outside the Province. A committee of experts, appointed by the Minister of Mines, Ontario, is investigating the Ontario iron ore situation, with special reference to our low-grade deposits. Beneficiation of similar ores, now being practised at Babbitt, Minn., seems to point the way for similar operations in Ontario. In some quarters hopes are entertained that new or old processes of treating by electricity will solve the problem of how to produce pig-iron in Ontario from Ontario iron ore.

#### *Non-Metallics*

The minor branches of the mining industry were on the whole depressed during the year. Not much feldspar was produced, and little graphite or mica. Tale is doing fairly well, but the mining of iron pyrites has practically ceased. A good demand was experienced for cobalt oxide, and refineries that were stocked with residues are now having a chance to market their accumulations. Towards the close of the year a decided increase of interest was exhibited in arsenic. Ravages of the boll-weevil in the cotton fields of the southern United States threaten the entire destruction of that crop. The approved method of checking this pest is by the use of calcium arsenate. Arsenic is produced in the United States as a by-product only, being recovered in the refining of other metals. The total production is quite insufficient for home needs, and arsenic ores in other quarters are being eagerly sought after. The price of the refined product has gone up to 12 cents per pound, and even higher prices are looked for, unless the United States government should establish a maximum. The enhanced demand has accrued to the benefit of the silver refining companies treating the Cobalt ores, which for many years have been the source of all the arsenic produced in Ontario. Owners of mispickel deposits in Eastern Ontario may now also have an inning.

Building operations in the cities were quite brisk throughout the year, and the demand for construction materials such as bricks, lime, sand and gravel, was correspondingly great. The value of buildings erected in 1922 showed an increase of about 40 per cent. over 1921.



# Quebec Mineral Industry in 1922

By THEO. C. DENIS \*

Although general industrial conditions are yet far from normal, the mining industry in Quebec has gradually improved during the year 1922, from a low ebb in January to a much better condition in December. The curve has shown a pretty continuous ascending tendency, whereas during the preceding year it had been decidedly downward.

Except for one or two of the principal items, the Quebec Bureau of Mines collects the mineral statistics for the calendar year only, so that it is too early to have any basis, other than general data observed throughout the year, to forecast the figures of production of the past twelve months; but they will show an appreciable increase in the value, and a substantial growth in the quantities, the value increases will be relatively less than the tonnages owing to the lower prices that prevailed.

## Asbestos

For many years Asbestos has been the largest individual item on the list of Quebec's mineral production, exceeding at times one half the value of the yearly total production, and the year 1922 will not be an exception. That the Quebec Asbestos industry has felt keenly the depression in the industrial conditions is shown by the fact that the production of this mineral fell from 14 $\frac{3}{4}$  million dollars in 1920 to 5 $\frac{1}{4}$  million in 1921. During the first months of 1922 the decline still continued and the bottom of the wave seems to have been reached last April, when a very slight improvement began to make itself felt. The majority of the asbestos operators had to suspend mining and milling during the winter and the spring, and the few mines that continued to produce did so at a greatly reduced capacity. It is a remarkable fact that at the end of the year 1921 the value of the stocks of asbestos remaining unsold considerably exceeded the value of the shipments during the year. It was especially the long fibre qualities that were slow to move, and the producers had to reduce the prices of the higher grades, proportionately more than the mill-stock qualities. In fact, the average price of the crude No. 1, which for the year 1921 was \$1,300 a ton, had to come down in November 1922 to \$700, the longest fibre bringing only \$900.

There has been a general tendency and impression to ascribe the slump in the demand for the Canadian Crude fibre to the inroads made by the Rhodesian asbestos, in markets that have, in the past, been exclusively supplied by the Quebec fibre. While there is no doubt that the Shubanie and the Victoria asbestos are becoming serious competitors of our asbestos in the United States market, the official figures of shipments of South Rhodesian material during the first seven months of 1922 show a depression much more marked than in Canada. From January to August 31st., 1921, South Rhodesia exported 17,069 tons of asbestos, and for the corresponding 1922 period this had fallen off to 7,365 tons.

The figures of shipments of Quebec asbestos in 1921 were 87,475 tons, valued \$5,199,789, and it is probable that for 1922 the tonnage will show an increase of 35 p.c. and the value 20 p.c. on these figures.

\* Supt. of Mines, Quebec.

It is interesting to note that the government has reduced the royalty on asbestos, from 5 p.c. on the gross value of the asbestos shipped, to 2 $\frac{1}{2}$  p.c., thereby cutting it in two. The order-in-council to this effect was passed on October 21st 1922, and is retroactive to January 1st. 1922, so that on all asbestos produced from January 1st. the new rate will apply.

## Copper, Lead and Zinc

The mining of metalliferous minerals, unfortunately, does not show signs of reviving. It has been essentially inactive throughout the whole year, as regards production. All our mines of sulphur-copper ores remained idle, whereas four years ago they were producing at the rate of six to seven hundred tons a day. One of these, the Weedon mine, has a record to be proud of. From 1911, when it began shipping copper-bearing pyrite, until 1921 when it was shut down, this mine produced nearly 600,000 tons of ore, representing a total value of 5 $\frac{1}{2}$  million dollars.

There has been no mining of lead-zinc ore, the Montauban mine having remained closed all year, in spite of the marked improvement in the market for these two metals. The Federal Lead and Zinc Company continued the development of their Gaspé property and the construction of the waggon road, 45 miles long, to connect the mine with the railway at Cascapedia station.

## Gaspé Promises Much

That the Gaspé peninsula contains metalliferous deposits that will eventually give good account of themselves, received further corroboration by the staking of several claims for copper in the region of the headwaters of the York river. An officer of the Quebec Bureau of Mines made a short examination of this region last summer and found that the geological conditions are favourable to the presence of deposits of copper of workable size. The rocks are porphyries, volcanic tuffs, trap rocks and granites which occupy a very large area, to the exclusion of all other rocks. The mineralization is widespread, as evidenced by the numerous green stains of carbonates of copper. A series of samples taken in various places gave assays varying between 2 and 10 p.c. copper. These new discoveries, added to the known presence of native copper and sulphides in Matane; the deposits of lead and zinc of the Cascapedia river; the zinc-lead-copper occurrences of Christy township; the copper showings of Matapedia township and of Port Daniel township; the serpentine of Weir township and of the Albert mountain massif, show that the whole of Gaspé peninsula, which constitutes the terminal area of the Appalachian mountain system and embraces a region which has been extensively disturbed by mountain building forces, intense volcanic action and igneous intrusion, offers a promising and almost untouched field to the prospector.

## Chromite and Molybdenite

There was practically nothing done in chromite mining, although in November there were rumors that the Belanger mine, at Coleraine, was to be reopened by the United States Ferro-Alloys Corporation, who bought the property after the liquidation of the J. V. Belanger Chrome Mining Company. The future of the Quebec



chromite industry is very unpromising. Our chrome ore cannot compete, for costs, with African or New Caledonian mines.

A renewal of interest is apparent in the deposits and occurrences of molybdenite throughout the province, owing to progress made in the metallurgy of molybdenum during the last twelve months. The deposits on the north shore of the Ottawa river, as well as the very promising occurrences in the region of Kewagama lake and Harricana river, in North-western Quebec, could furnish a steady supply of molybdenum ore. Molybdenum steel is being used in special parts of automotive machinery, such as axle-shafts, drive-pinions, steering-gears and knuckles.

#### *Non-Metallic Minerals*

The other non-metallic minerals, feldspar, mica, magnesite, kaolin, whose production during the preceding two years had suffered greatly, have experienced a renewal of activity, and the production for the past year will be considerably in excess of the figures for 1921. The feldspar of the Buckingham district, more particularly of Derry township, is acquiring an enviable reputation and the demand is growing greatly. There are at present three deposits that are shipping actively. This feldspar is very pure, with practically no quartz. An idea of the grade may be formed from the fact that analyses of carload-lots run up to 13½ p.c. potash and 1½ to 2½ p.c. soda. It may also be mentioned that the St. Lawrence Feldspar Company is at work developing the large feldspar deposit of the Mingan seigniory, on the north shore of the Gulf of St. Lawrence. This company has begun the construction of a wharf, which will permit shipping by vessels of a large tonnage.

The production of mica in 1921 had been the smallest recorded since the Quebec Bureau of Mines began to collect statistics of mineral production, some twenty-five years ago. From a value of \$282,000 in 1920 it fell to \$42,000 in 1921. But in the spring of 1922 the demand improved greatly, and although the production this year may not be a record, it will be approximately normal. The principal mica-producing district of the Province is the region that comprises the basins of the Gatineau and Lièvre rivers, two tributaries of the Ottawa. There are, it is true, mica deposits, such as in the vicinity of Quebec city and in the lake St. John region, but the Lièvre-Gatineau district alone supplies more than three-quarters of the Canadian production of mica.

The China-clay industry of Amherst township took a long step forward this year. Underground development work at the St. Remi mine of the Canadian China Clay Co., blocked out a considerable body of white kaolin which is being mined by the caving method. This material, washed of all sand, filter-pressed and dried, is perfectly white and finds a market as a paper filler; in the paint industry; and in all industries needing a white filler. In October the mining method was being altered to permit of a larger output at a reduced cost. It was then expected that the production would soon be increased to 30 tons per day of refined kaolin.

Another kaolin deposit was being opened up one mile to the south of the St. Remi mine by Mr. J. C. Broderick, who has a washing plant under construction.

The production of building and road materials was very active throughout the whole year. Construction, of buildings and of roads, created a keen demand for brick, stone, lime and cement, which will probably show an increase of 30 p.c. in value over the 1921 production which was 9¾ million dollars.

#### *Prospecting for Gold*

A review of the mining industry of the year, would not be complete without a short reference to the prospecting activity which prevailed throughout the whole summer and fall in the north-western part of the province, both in the district immediately east of the Ontario-Quebec line, and also in the region of the headwaters of the Harricana river. Beginning in March, this rush developed in the extension, into Quebec, of the mineralized belt which in Ontario includes the two gold camps of Kirkland lake and Larder lake. The main centers of claim-staking in this belt are lakes Tremoy, Héré and Pelletier, in Rouyn township; lake Fortune in Dasserat township, and lake Renaud in Boischatel township. The discoveries made at all these places are said to be extremely encouraging, and in these three townships there are at present some 200 claims staked, of a total area approximating 30,000 acres.

In the Harricana district three American syndicates are now at work carrying on shaft-sinking and diamond-drilling on three of the more promising properties of the region, viz, the Martin mine, the Stabell claims, and the Foisy-Kengrow claims, all in Dubuisson township.

In conclusion it may safely be stated that in the year 1922 the Quebec Mineral Industry took a long step towards returning to normality, and it is probable that the value of the products of our mines and quarries will show a substantial advance on the figures of 1921, which totalled 15½ million dollars.

#### LEAD AND ZINC IN UNITED STATES IN 1922

During 1922 there was produced in the Mississippi Valley lead-zinc district 256,000 tons of lead, and in the western states, 208,000 tons of argentiferous lead, a total of 464,000 tons, which is an increase of 54,300 tons over 1921, according to the United States Geological Survey.

Zinc to the amount of 447,000 tons was produced, against 256,746 tons in 1921. Of this the Joplin district accounted for 254,000 tons, and the east and west the remainder in equal proportion.

The export and import trade in lead and zinc is small in proportion to the purely domestic production and consumption. Last year 52,000 tons of lead bullion was imported from Mexico, while 28,000 tons of zinc from United States ores was exported.

The average price for lead in New York during the year was 5.7 cents a pound, as compared with 4.5 cents in 1921. At the end of the year the price was 7.25 cents. Zinc prices at St. Louis averaged 5.7 cents a pound, against 5.0 cents in 1921, and rose to 7.35 cents at the middle of November, being 7 cents at the end of the year.

Next to the United States, Mexico is the largest oil-producing country in the world. These two countries produce at present nine-tenths of the world's petroleum. One-fifth of the whole area of Mexico is underlain by petroliferous measures.



# Coal Mining in Nova Scotia in 1922

By F. W. GRAY\* M. I. Min. E.

The tendency of coal production in Nova Scotia is shown by the following table:

|                      | 1913      | 1919      | 1920      | 1921      | (Estimated)<br>1922 |
|----------------------|-----------|-----------|-----------|-----------|---------------------|
| Output at N. S.      | 8,103,404 | 5,390,196 | 6,137,156 | 5,741,928 | 5,561,000           |
| Mined by means of    |           |           |           |           |                     |
| British Empire       |           |           |           |           |                     |
| Steel Corporation    | 1,204,410 | 3,000,720 | 3,429,286 | 1,913,688 | 1,781,000           |
| Mined by other       |           |           |           |           |                     |
| methods              | 881,694   | 789,476   | 1,007,870 | 1,912,410 | 1,800,000           |
| Percent mined by     |           |           |           |           |                     |
| Steel British Island | 15        | 55        | 55        | 33        | 31                  |

The year 1913 was the one that saw peak production of coal in Nova Scotia, as it saw peak production of many other minerals in Canada. The year 1922, in contradistinction, will in all probability prove to have been the one of lowest production for a number of years to come.

1922 was in all respects a poor year, so far as the fundamental conditions of business are concerned, and the brisker demand that developed for coal in the late summer of 1922 was not so much the result of real business improvement in Canada, as a reflex of the five months' strike of the United Mine Workers of America in the United States. The business outlook is still clouded, and there is no general agreement among those who attempt the forecasting of business conditions as to what the immediate future holds. The basic weakness of industrial conditions is shown by the rapidity with which the shortage of coal resulting from the five months' strike in the United States has changed to a condition where substantial stocks of coal are reported at producing points, simultaneously with very partial and irregular work at the bituminous mines. Any absolute shortage of bituminous coal at consuming centres in the United States and Canada is at this date a result of transportation congestion and car shortage.

## A Broken Year

The coal mines of Nova Scotia in 1922 did not achieve anything like capacity production. For the first six months of the year there was a total lack of demand, and the effect of this on production of coal was intensified by the policy of the miners' leaders in advocating restriction of production by "striking on the job." The three weeks' strike of the United Mine Workers in August, and the damage done to the producing capacity of the mines by the withdrawal of the maintenance forces and physical opposition to their replacement by officials, further and very considerably diminished the output for the year.

In November, a sleet storm of great destructive effect disorganized the power lines and all wire communication at the collieries in the Sydney Field, and complete repairs cannot be made until the spring.

The cumulative result of these hindrances to production has been to make 1922 a year of memorably low coal outputs, and one that in all likelihood will mark a low point in the current history of coal mining in the Province.

With 1923, it is believed, will commence a steady climb of outputs to figures comparable with pre-war tonnages, although it is not possible to forecast the date when the maximum production of 1913 will again be attained. It can hardly fall within the nineteen twenties.

## St. Lawrence Trade Regained

The most encouraging feature of the year was the large-scale resumption of coal shipments to St. Lawrence ports,

\* Headquarters staff, British Empire Steel Corporation.

which reached approximately 1,400,000 tons, or seventy percent of the maximum seasonal shipments previously attained. Shipping was prolonged in the St. Lawrence until the latest date as yet attempted, the S. S. "Rosecastle" leaving for Levis from Sydney on November 29th., and leaving that port for Sydney on the morning of December 10th. It is understood an attempt will be made with the assistance of ice-breakers to bring about an early opening of navigation from the port of Sydney in the spring of 1923. A successful demonstration of the possibility of prolonging the season of open navigation in the St. Lawrence River and Gulf is of much importance to the Nova Scotia trade, which has in the St. Lawrence ports its natural and most important market.

Another encouraging feature of the year has been the use of a substantial quantity of sized by-product coke as a domestic fuel and its substitution for anthracite. The demand for this cleanly, hot fuel is much greater than the supply, the coke so far used having been a by-product of the screening of coke primarily intended for blast-furnace uses; but it has demonstrated the entire suitability of sized coke as a satisfactory substitute for anthracite, and this is doubtless but the beginning of much greater things.

## Continued Shortage of Skilled Miners

The chief deterrent to production of coal is still the shortage of men actually mining coal at the working faces. While the aggravated shortage of the war years has been partially remedied by augmentation of the numbers of men



MR. F. W. GRAY

at the face of the coal, there is still a grave shortage of this all-important class of workers, accompanied by a corresponding shortage in the outputting of coal, the shortage of miners being the cause and the shortage of production the result. This statement is unfortunately not as elementary as it may appear, nor is the remedy quite so simple

as the diagnosis. Until the number of face-workers is restored to pre-war figures the production of coal cannot attain to pre-war tonnages. This is the real problem of coal production in Nova Scotia.

#### *Development of the Mines*

Capital expenditure on the development of new mines and the winning of new coal areas has been limited during the past ten years, but coal-mining is an industry that cannot progress unless the process of mining coal is accompanied by a concurrent process of opening up new territory. Therefore the resumption of capital expenditures on a substantial scale may be forecasted as not likely to be long delayed. The original sin of coal operators the world over is inadequate provision in cost-accounting for the new expenditures that are required to maintain a wasting asset, and in Nova Scotia, as elsewhere, the price at which coal was sold to customers in past years has not always included a sufficient margin of profit over labor and materials charges to represent a real profit when the cost of new mines and capital redemption has been counted in.

The Dominion Coal Company is sinking an important new shaft to the Phalen Seam between the existing Nos. 1 and 2 collieries. This shaft will win a submarine area tributary to both collieries named but too distant from No. 1 and 2 shafts to be economically won to these points. The new shaft will be equipped with modern hoisting machin-

ery and the latest type of surface erections. The underground layout will be designed to handle a large output, gathered from a very extensive area, and, when completed, this new mine will, it is expected, become a producer of first-rate importance with a long life before it.

This Company is also developing the Emery Seam in the Glace Bay district, by a slope opening. Electrically operated coal-cutters of the shortwall chain-cutter type are being used in this mine, the seam being well adapted for electrical cutters.

At Springhill Mines, two new slope openings, known as Nos. 6 and 7 Collieries, are being rapidly developed to important producers. The old boiler plant at Springhill, a very out-of-date unit, is being replaced by a more efficient plant. During November the Springhill group of mines produced almost 50,000 tons, a figure that has not been reached for seventeen years by a single month's output.

The Acadia Coal Company's mines are producing at a high rate, the daily production reaching 2,500 tons on good days.

The settlement after the U. M. W. of A. strike in District 26 in August resulted in the signing of an agreement which covers the whole of 1923, and from this point of view there should be a year of settled conditions ahead. Next year should be one of recovery from depressed conditions and of moderate production.

## Metalliferous Mines of Nova Scotia during 1922

By THOMAS BEVERIDGE\*

On going to Nova Scotia some eleven years ago, having previously read many of the geological reports on the province, I was surprised beyond words to find that so little was being done in the development of the mineral resources. The reports of Drs. Faribault, Gilpin, Fletcher and others speak in the most glowing terms of the mineral wealth, and many who have visited the province would be as much astonished as I was at the lack of a systematized plan in the development of what is one of its richest assets. Hitherto mining has practically been confined to the production of gold, and this has been done in what might well be termed a blindfolded manner; and to-day while more prospecting and development is noted in almost every known gold-mining district, Nova Scotia is falling far short of what might reasonably be attained. If the reports of these gentlemen of undoubted standing are true (and I have every reason in saying they are), what is wrong? This question in my opinion can be answered by one word, namely—development. While geological information is exceedingly helpful to the mine owners and engineers in the development of their property its usefulness amounts to nothing when the practical phase of the question is neglected, and that is the case in Nova Scotia.

During the past summer I made a tour of inspection of the mines, other than coal, and quarries for the Provincial Government of Nova Scotia and I visited every known gold mining district, and with the opportunity afforded me I made a very close study of the actual condition of affairs and of the possibilities that could reasonably be expected with more up-to-date machinery and a modern system of mining and milling. That the loss of gold over the plates is the chief cause of the present condition of the gold mining in Nova Scotia, is an undoubted fact; and when I place this loss in most cases at from 30 to 50 per cent, I think it can clearly be seen why the gold industry is in the

position we find it now. The following assays will prove to a certain extent the truth of my contention:—The first, made by the Anaconda Copper Mining Co. on August 12th 1922, of concentrates taken from the tailings of the Montague Gold Mining Coy's dump, gave gold, 2.16 oz. per ton; Arsenic 43.7 per cent. The second, made by the General Chemical Coy. in September, 1922, from the same dump, gave gold 3.18 oz. per ton; Arsenic 36.5 per cent; sulphur 25 per cent. Another striking proof was clearly demonstrated by a small company in another district who put through their stamp mill 10 tons of old tailings with a recovery of three dollars per ton, leaving, no doubt, values still in the tailings.

With the high percentage of arsenical iron and other gangue matter in the quartz, and with it a large percentage of barren slate, the percentage of pay ore is materially reduced. I fail to see how it is possible with the present system of amalgamation and no treatment of the tailings to obtain any better results than have been secured in the past. There is no doubt in my mind that the high percentage of arsenical iron, preventing amalgamation, carries the gold over the plate, and is the root of most of the difficulties. Another difficulty must not be lost sight of—that with the large quantity of slate crushed, containing as it does a large percentage of tale which cakes on the plate necessitating a big flow of water, values are lost because of the undue force of the stream of water.

With the adoption of a suitable system of extraction (and I cannot at present see that it is in any way unsurmountable,) and with the development of cheap power, of which the Province has abundance, gold mining should take a fresh lease of life and prove a profitable industry. It is most interesting to note that the Mines Department at Ottawa are at least making some effort to try and assist this most important industry by making tests of all the tailing dumps in the Province, and by so doing to indicate an efficient system of extraction. I have no hesitation in saying that if this had been done long ago and a solution

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found. I see no reason why the Province of Nova Scotia would not now be holding its own with any part of Canada as a gold producer. That there are great possibilities in different parts of the Province, I feel, will be proved in the near future. The neglect in the development of the large bodies of low-grade ore in favour of the narrow high-grade veins has done much to retard development.

During the past year only one company has been working regularly, viz., The Sherbrooke Mining and Power Corp., Goldenville, Guysboro County. They have a large body of low-grade ore and when sufficient development work is done to increase their output a reasonable profit should be shown. Having their own hydro-electric power I am told by the manager that they can mine and mill at a little under \$3. per ton. There are quite a number of other properties that have been producing in a desultory way, but the lack of systematic modern development has prevented any notable result.

An increase of about 300 oz. of gold over 1921 is encouraging but in 1923 a much larger output can reasonably be expected. The mines that will, it is hoped, start producing during the year will be the Montague, Cochran Hill, Tangier, Beaver Dam and Nova Scotia Mineral Reduction Coy. At the Montague and Cochran Hill a new flotation process patented by Messrs. Harr Bros. will be installed and should go far to surmount the milling difficulties. The concentrates from these mines will be shipped to the United States for treatment. The Montague has been a good producer in the past and with the solving of the milling problem good results should be shown. Cochran Hill has a 75 foot zone of low-grade ore known as the Mitchell belt. Samples have lately been assayed that have given surprising results. The Tangier also has a good re-

cord but I cannot say they will meet with the success they should while using the present amalgamation process and no treatment of tailings. Beaver Dam and the Nova Scotia Mineral Reduction Corp. are adopting a semi-roasting system, but at the date of my visit no definite plans had been made as to what further method would be used after crushing and roasting.

The development of the Sheet Harbor hydro-electric power by the Government for the supplying of power to New Glasgow and surrounding towns should do much for gold mining, as the trunk lines pass through and near many well-known mining districts such as the Fifteen Mile Stream, and should have a tendency to increase activity in these several camps.

Special mention should be made of the Malagash salt mine, operated and owned by Messrs. Chambers and McKay. A shaft has been sunk to a depth of 200 feet and large bodies of salt have been opened up by driving and drifting. It is pleasing to note that there is a marked improvement in both whiteness and chemical quality as the lower depth was reached. At a conservative estimate there is about twenty five millions of tons of salt in the deposit.

In the case of other minerals such as iron, copper, etc., only prospecting is being done at present.

In conclusion I may say that gold mining in Nova Scotia depends on the following, (1) suitable and cheap means of extraction. (2) up-to-date machinery. (3) the use of cheap power, of which the Province has abundance in almost every district. (4) a better system of mining and management. With due attention to the above I have no hesitation in saying that Nova Scotia will in a few years take its place as a large gold producer.

## Mining In British Columbia During 1922

By ROBERT DUNN \*

The value of the mineral output of British Columbia for the year 1922 is estimated to be \$32,167,463, as compared with \$28,066,641 in the previous year, an increase of \$4,100,822, as announced by Hon. W. M. Simon Minister of Mines. The feature of the 1922 production is the increase in the gold and silver values, the former amounting to \$4,116,816, which is \$1,079,462 better than in 1921, and the latter totalling \$4,034,154, which is \$2,442,953 in excess of the previous year.

Credit for this lies to a great extent with the Premier Gold Mining Company, of the Portland Canal Mining Division. The lode gold and silver taken from the Cassiar District, of which Portland Canal is a part, are estimated to be: gold, 170,200 ozs., silver, 4,816,000 ozs. The greater part of this, in fact practically all of it, came from this great mine.

A telegram from our British Columbia correspondent states that Mr. H. A. Guess, president of the Premier Gold Mining Company, has announced that the company will pay a dividend on January 3rd of \$750,000. This is 15 per cent. of the \$3,000,000 capital, and brings the total paid to shareholders up to \$3,150,000. If this is a New Year's resolution, to be continued throughout the year, the Wonder Mine of British Columbia cannot fail to stimulate in that province an interest in mining development that is already highly satisfactory. — Editor, C. M. J.

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Placer gold output also shows an increase the total being estimated at \$297,000, an increase of \$63,800. Marked interest has been taken during the year in the placer fields. Hydraulic and dredging operations, actual and projected, are multiplying. While the old camps of the Cariboo and Atlin are not more than holding their own, new possibilities are being manifested. Mr. Sloan directs attention, in this connection, to the Cedar Creek field as proving that the historic Cariboo has not yet given up all her riches. J. D. Gallowsay, the resident government mining engineer, emphasizes the importance of this discovery from which some \$73,000 worth of gold was taken during the season notwithstanding that both water and equipment were limited. The proving of one rich high level channel, such as that upon which the present Cedar Creek diggings are located, may lead to the finding of more ground of a similar character in the Cariboo. Certainly it is very encouraging and undoubtedly will result in more intensive prospecting, along somewhat different lines from what has taken place in the past.

In regard to precious metal production it is to be noted that the Belmont Surf Inlet Mines Ltd., Princess Royal Island, have added quite materially to the gold output and that recent developments, in point of ore reserves, are said to be satisfactory. The Nickel Plate Mine, Hedley Mining Co., has done little while the Rossland Camp, which in former years was the backbone of the lode gold industry, has not been producing. The latter centre, however, is expected soon to be as active as before. The output of silver has been swelled by contributions from many comparatively



small, but potentially important, mines of the Slocan and other parts of the East Kootenay, where there has been a revival that augurs well for the future.

Only one of the base metals shows a decline as against 1921, viz., copper. The value of the output is estimated to be \$4,642,060, a drop of \$837,564. The reason for this is that the Britannia Mining Co., Howe Sound, has not been shipping. The destruction of the plant by fire and other difficulties forced the Company to concentrate on development and reconstruction. The prospects are that it will be ready to resume production early in the New Year. Under the circumstances it is gratifying that the total value of the provincial production was so well maintained and the explanation is to be found in the achievement of the Granby Consolidated Mining and Smelting Company, whose output is placed at 29,690,000 lbs.

Lead and zinc outputs have increased, the first by \$790,542 and the last by \$455,543. The silver-lead-zinc ores of the Kootenays are responsible, the bulk of the two latter metals coming from the ores of the Sullivan Mine, Kimberley. The new electrolytic method of treating zinc ores at the Trail Smelter, Consolidated Mining and Smelting Co., has given courage to many independent operators and the new concentrator at Kimberley, now under construction, strengthens the conviction that conditions have permanently improved and that the immediate future of the mining industry in eastern British Columbia is unusually bright.

The coal production will approximate 2,559,414 tons, valued at \$12,797,070, an increase of \$377,095. Coke is estimated to drop from 59,434 to 40,837 tons, a decrease in value of \$130,179. These figures are considered gratifying in view of the fact that the Crow's Nest field was idle for several months and also for the reason that the collieries of the Province, and particularly those of Vancouver Island, have had their market invaded by imported fuel oil. Mr. Sloan asserts that one million tons of locally produced coal is being displaced annually by these importations and that, if the industry is to grow as it should, there will have to be a reduction in the amount of this fuel consumed in the Province.

Following are the details of the preliminary estimate of mineral production for 1922:

# NORTH EASTERN MINERAL DISTRICT

The year 1922 has been an encouraging one for mining activity throughout the North-eastern District, and it would seem that the depression of the past two years has definitely passed. The lode mineral production is as yet small but the development work done this year gives substantial promise of a largely increased output in the future. The great need of the district is capital to test the numerous mineral showings held by prospectors, and it is to be hoped that the successful work this year will encourage others to take up promising properties.

A marked revival in placer mining has been evident in the Cariboo and Quesnel Divisions. The important discovery of Cedar Creek camp (discovered in the late fall of 1921) has aroused considerable interest and during the summer there was an influx of prospectors. Cedar creek proved during the year to be an important find, both in itself as a bonanza, and as an indicator of the possibilities of that section of the country.

Much Keystone drilling of placer gravels has been carried out in the Cariboo during the year, with satisfactory results in several places. The hydraulic mines of the Cariboo had a poor year, due entirely to an insufficiency of water supply caused by an unusually dry season. Rains late in the fall enabled some fall clean-ups to be made but the hydraulic gold production was much less than would have been the case under normal water conditions. Notwithstanding this the placer production of the Cariboo District was at least double that of 1921.

The coal-fields of the North-eastern District have not as yet made much production. A small tonnage (700 tons) was again mined from the Betty mine near Telkwa. Diamond drilling of the Copper River Coal Company's property was carried out during the season, and it is believed that the results were satisfactory.

The following table gives a rough estimate of what the mineral production of the year will be:

|                              |           |
|------------------------------|-----------|
| Placer, gold . . . . .       | \$140,000 |
| Lode, gold, ounces . . . . . | 40        |
| Silver, ounces . . . . .     | 32,500    |
| Lead, pounds . . . . .       | 50,000    |
| Zinc . . . . .               | 75,000    |

## PRELIMINARY ESTIMATE OF MINERAL PRODUCTION FOR 1921 AND 1922

|                                                | Production 1921 |              | Estimated Production 1922 |              |              |           |
|------------------------------------------------|-----------------|--------------|---------------------------|--------------|--------------|-----------|
|                                                | Quantity        | Value        | Quantity                  | Value        | Increase     | Decrease  |
| Gold, Placer . . . . . oz.                     | 11,660          | \$ 233,200   | 184,800                   | \$ 297,000   | \$ 63,800    | .....     |
| Gold, Lode . . . . . oz.                       | 135,663         | 2,804,154    | .....                     | 3,819,816    | 1,015,662    | .....     |
| Total Gold . . . . .                           | .....           | 3,037,354    | .....                     | 4,116,816    | 1,079,462    | .....     |
| Silver . . . . . oz.                           | 2,673,389       | 1,591,201    | 6,278,840                 | 4,034,154    | 2,442,953    | .....     |
| Copper . . . . . lb.                           | 39,036,993      | 4,879,624    | 30,300,300                | 4,042,060    | .....        | \$837,564 |
| Lead . . . . . lb.                             | 41,402,288      | 1,693,354    | 48,231,000                | 2,483,896    | 790,542      | .....     |
| Zinc . . . . . lb.                             | 49,419,372      | 1,952,065    | 59,010,000                | 2,407,608    | 455,543      | .....     |
| Total Metalliferous . . . . .                  | .....           | 13,153,598   | .....                     | 17,084,534   | 3,930,936    | .....     |
| Coal . . . . . tons                            | 2,483,995       | 12,419,975   | 2,559,414                 | 12,797,070   | 377,095      | .....     |
| Coke . . . . . tons                            | 59,434          | 416,038      | 40,837                    | 285,859      | .....        | \$130,179 |
| Total Collieries . . . . .                     | .....           | 12,836,013   | .....                     | 13,082,929   | 246,916      | .....     |
| Miscellaneous, and Building Material . . . . . | .....           | 2,077,030    | .....                     | 2,000,000    | .....        | 77,030    |
| Total Production . . . . .                     | .....           | \$28,066,641 | .....                     | \$32,167,463 | \$ 4,100,822 | .....     |



Following is a brief summary of the more important lode-mining developments in the District during the year:

**COSSA-MISSA MINE, DOK.**—The crosscut tunnel on this property was continued and at a distance of 400 feet from the portal the "Blind Vein", which has previously been developed by a winze from the upper crosscut tunnel, was struck. Where cut, this vein has a width of from 10 to 12 feet and carries mineralized bands on both walls. The minerals are chalcocite, bornite and free gold, and it is expected that a width of from four to five feet will make good milling ore. Drifting on the vein is to be carried on all winter.

Prospectors in the Usk section were busy all summer developing their properties and some of the showings have been considerably improved.

**SILVER STANDARD MINE, HAZELTON.**—This property was re-opened in January and operations were continued for about three months, when the property was again closed down. The work consisted of taking out ore and milling it, some 500 tons being milled. The property is now in the position that further development is required and it is believed that this may soon be arranged for.

The copper properties on Rocher Deboile mountain were not re-opened during the year.

**FIDDLER PROPERTY, DORREEN.**—Development of this property was carried out during the summer with a small force and is being continued. Plans are now being prepared for the erection of a small mill on the property and it is expected that this work will be carried out next year.

**HUDSON BAY MOUNTAIN, NEAR SMITHERS.**—Important mining operations have been commenced on Hudson Bay mountain by Mr. J. F. Duthie of Seattle. Three groups are now under option to Mr. Duthie and steady work is being carried out on two of them under the superintendency of Mr. John R. Turner. The Mamie group, which was the first one acquired, carries good values in gold and zinc and is now being developed by a 1,000 foot crosscut tunnel; this tunnel is now in about 300 feet and is expected to reach the vein sometime next spring. The Henderson group adjoining the Mamie was secured in July and by the end of October it is reported that about \$20,000 worth of ore had been taken out. This vein carries galens, zinc blende and grey copper; this last mineral is very rich in silver and analyses of the pure mineral show that it contains about 25% silver and is properly classified as freibergite. Besides the high-grade hand-sorted ore that has been taken out, much of the material on the dumps is good mill feed. The vein is being developed by drift tunnels and in addition open-cutting and stripping of the surface have been done. Altogether the showing is a very promising one. The Hanna group was acquired in the fall and with the exception of a little surface prospecting no development has yet been done. The veins on this property carry silver-lead-zinc minerals. It will probably be necessary to develop this property by sinking and so it has been impracticable to start this work until next spring.

Gasoline-driven compressors have been put in on the Mamie and Henderson properties, camp buildings have been erected and much preliminary work done. From 25 to 30 men are being employed all winter.

**BABINE RANGE.**—Gold quartz showings on Dome mountain were staked some years ago, but until this

year little work had been done on them. An option on all the more important claims in the camp were secured this year by Mr. T. E. Jefferson, acting for a New York syndicate. Mr. Jefferson's plan of work for the season was to prospect the surface thoroughly by open-cutting, stripping, etc., Mr. A. J. Gaul was engaged as assayer and an outfit taken out to the camp; in this way all the veins were properly sampled and assayed and much information secured as to values.

There are a number of quartz veins on the mountain that are well defined and persistent; one small vein having been traced for about 4,000 feet. They are mineralized with pyrite, arseno-pyrite, chalcopyrite and some galena. The principal value is gold, apparently contained in the sulphides, and low silver values. The lead and copper contents are unimportant.

The most important showing is that known as the "Forks". This is a large outcropping of well mineralized quartz which would seem to be part of a large vein at least thirty feet wide. Average values are said to run about \$15 to \$20 a ton. This vein cropping occurs at the confluence of two creeks right in the creek-bed and is in a difficult place to prospect. Owing to the over-burden of clay, gravel, etc., and a rock capping of schist it had not been possible to trace this vein longitudinally on the surface, and it will apparently be necessary to sink on the vein to develop it. The showing, however, is a very promising one and the continuity of the small veins of the mountain gives a reasonable hope that this big vein will also be continuous.

Another large vein, about ten feet wide has also been prospected and although somewhat lower grade than the "Forks" showing, is well worth development.

It was not practicable to carry on winter work on this property, so late in the fall work was stopped, but operations will be resumed on a larger scale next spring. The property is well situated for mining, and a suitable wagon road to Telkwa can be put in which will have a length of about 20 miles.

**DRIFTWOOD CREEK.**—Development of a number of properties in the Driftwood Creek section of the Babine range was carried out during the year by the owners and others. The Highland Basin group owned by Cane and King showed up very well. This is a silver-lead-zinc property carrying good values in silver and in places promising gold values. It is a contact ore-body lying between schist and rhyolite and although irregular in its nature is likely to contain some good shoots of ore.

Other properties developed during the year were the Little Joe group, Social group, Shamrock group, Silver King group and Harvey property.

**COAL MINING.**—About 700 tons of coal was mined from the Betty mine on the Telkwa river, seven miles from the town of Telkwa. The property is under lease to Gillespie and Wilson who mine on a small scale and haul the coal to the railway in wagons or sleighs.

The Yorkshire and Canadian Trust Company, liquidators of the Copper River Coal Company, proceeded with the diamond drilling of the property of the company. This coal property is situated on the headwaters of the Zymoetz river about 40 miles from Telkwa; it was described in detail in the 1914 Annual Report of the Minister of Mines. Four holes were drilled and it is believed that the results were satisfactory in showing the continuity of the coal seams. It is expected that further drilling will be carried on next year.



**CEDAR CREEK.**—It is very encouraging to be able to record a production of about \$130,000 in placer gold from the Cariboo this year, as this is about double last year's production. This increased output is due to the activities of the new Cedar Creek camp.

Cedar Creek is a small stream flowing into Quesnel Lake on its northern shore. Sixty years ago it was worked for placer gold and a small amount taken out. Late in the fall of 1921 Platt and Lyne located good pay dirt in the gravel, and in crevices in the bedrock on a bench half a mile back from the lake and 600 feet above it. A number of leases have been found subsequently to contain workable gravel in what is presumably an old creek bed of pre-glacial times that has been left high above the present creek level.

The total production of the camp has been about \$75,000, almost all of which has been produced by rockers. This is a very creditable start for the first year and from all indications a larger production should be made next year.

**HYDRAULIC MINES.**—All the usually operated hydraulic mines in the Barkerville section were operated during the year, but as previously indicated, lack of sufficient water resulted in a small output.

The Kitchener mine at Keithley, which was equipped with an hydraulic plant last year, had a fairly satisfactory season and it is reported that a good clean-up was made.

**KEYSTONE DRILLING.**—Testing of placer gravels by drilling was carried out in a number of places during the season. Outfits were at work on the Swift river, Cottonwood river, Antler creek, Cunningham creek, Grouse creek and Lightning creek. Most of this work had for its objective the testing of the gravels to see if any suitable dredging areas could be outlined. On Grouse creek the drilling was done to locate if possible the continuation of the old channel worked on the Waverley property.

**QUARTZ MINING.**—Quartz locations on Cunningham creek were developed by Moore and Wells with encouraging results. The veins are large and in places good gold values occur. Further development work will be resumed in March of next year.

#### CENTRAL MINING DISTRICT

Subjoined is an estimate of the mineral production of Mineral Survey District No. 3 for the year 1922, this being under the supervision of the Resident Mining Engineer at Kamloops;

| Mine                                  | Gold<br>Oz. | Silver<br>Oz. | Copper<br>Lbs.                         |
|---------------------------------------|-------------|---------------|----------------------------------------|
| Iron Mask Mine,<br>Kamloops           | 12          | 2,000         | 300,000<br>(in form of<br>concentrate) |
| Liberator Mining Co.,<br>Hope         | 400         |               |                                        |
| Pioneer Mine,<br>Lillooet             | 640         |               |                                        |
| Small Placer<br>Operations            | 350         |               |                                        |
| White Elephant Mine,<br>Okanagan Lake | 433         | 170           |                                        |
|                                       | 1835        | 2,170         | 300,000                                |

With the exception of the Iron Mask Mine all the properties are shut for the season. In the case of the Iron Mask, at the present moment, about 700 tons of copper concentrate with a copper content of about 140 tons, or 280,000 lbs. is stored at the mine.

**GOLD.**—The biggest producer of gold in this district for the year is the White Elephant Mine at Ewings Siding on Okanagan Lake. 290 tons were hauled from the mine to Okanagan Lake and shipped to Trail. The average value of this ore was \$30 per ton, almost all in gold. The hauling cost, railway freight and treatment charges on the ore practically consumed all the profit. After some further development work, with the erection of a mill, this property may easily become an important producer of gold.

The Pioneer Gold Mines Ltd., operating the Pioneer Mine on Cadwallader Creek, is the next most important producer gold. Owing to breakage in the plant the property was forced to shut down in October. This year a small cyanide leaching plant was erected on this property to handle the tailings from the original stamp mill.

The Liberator Mining Co., operating the Emancipation Mine at Hope, is next on the list. Lack of development work, principally, is handicapping this property at the present time. On the property this year the construction of the small stamp mill and aerial tramway were brought to completion. The mill consists of a 7 x 9 crusher, a 5-stamp battery and one Wilfley table, the tailings from the table being put through a 3-cell flotation machine. The capacity of the whole plant is only 12 tons or so a day. More power than what is now obtained from the 50 H.P. gas engine for both mine and mill is needed before the capacity of the mill can be increased to any extent.

The Windpass Mine near Chu Chua on the North Thompson River is a gold property just recently bonded and should increase the gold production materially within a year or two.

With regard to placer operations, the Lillooet Alluvial Co., operating on the Horseshoe Bend of Bridge River, has completed all preliminary construction and is now in a position to carry on with the actual hydraulicking. This construction includes the erection of camp buildings, the building of 3 miles of flume and the installation of several thousand feet of large steel pipe. At the present moment three monitors are in position for use, derricks have been erected for handling the heavier boulders and with the warm weather next spring this should be a going concern. The success of this enterprise would mean a great deal to the district.

There have been some minor plant installations in connection with hydraulicking at Cherry Creek east of Vernon, and on the Nicola River near Bull Canyon, where in each case a flume was built, and also at one or two more points.

**SILVER.**—The silver produced in this district is of very little importance. When some of the complex silver-lead-zinc ores of the area are worked, the case will be different. At the present time almost all the silver comes from a couple of properties mentioned above as a by-product.

One silver property, the Homestake Mine on Adams Lake, is under option at the present time and has a good chance of being an important producer of silver, if not next year, at least the year after.

**LEAD AND ZINC.**—Neither of these metals has been produced in the district this year.

**COPPER.**—The small production of copper shown in the statement is all from the Iron Mask Mine near Kamloops. This property has an efficient 300-ton mill just completed and has been running one side (or half



of the plant) intermittently for a couple of months. Several oils (for flotation) have been tried out during this period and minor adjustments made. With the beginning of the new year this property should become a steady and important producer of copper concentrate. The completed mill includes a No. 4 Gates crusher, 18" x 24" rolls, two 64½" Marcy ball mills; 2 Dorr classifiers; Callow flotation rougher and cleaner rolls; two 12' x 24' Dorr thickener tanks; and two 10' x 24' x 50' conical bottom Dorr thickeners.

**NON METALLIC MINERALS.**—About 1200 tons of magnesium sulphate have been shipped during the year to the Basine Chemical Production Company from the deposits owned by the company near Ashcroft.

A small amount of sodium carbonate has been produced from Meadow Lake near Clinton. Further details will be forthcoming soon about this deposit.

#### SOUTHERN MINERAL DISTRICT

The Boundary, Slovan and Kootenay districts, which at one time almost comprised the mineral industry of the province, are still one of its most important parts. Its production at present is mainly from one large mine, the Sullivan, while a large number of smaller mines contribute a very respectable total.

**SULLIVAN.**—This mine, the outstanding zinc producer of the world, is responsible also for a respectable output of lead and silver. During the year the ore has been shipped to the concentrator at Trail, where the intimately mixed sulphides of iron, zinc and lead have been separated in the flotation plant. It is only the separation of these three sulphides by this means that has made possible the extensive use of the huge Sullivan ore-bodies. The new 1500-ton concentrator at Kimberley, close to the mine, will be completed shortly.

**INDEPENDENT MINES.**—During the year there were in operation a large number of small mines, mainly silver-lead and silver-lead-zinc, which shipped their ore or their concentrate to the smelter at Trail. The improved process both of concentrating complex ores and of smelting them have allowed the Consolidated company to offer to these independent shippers much better terms than formerly. When the 1000-ton concentrator at Trail is released for customs work on the completion of the Sullivan concentrator, it is expected that a still larger number of these small mines will be opened.

Among the independent mines operated during 1922 are the Silversmith and Bosun, Sandon; Paradise, Windermere; Standard and Van Roi, Silverton; Ottawa, Surprise, Noble Five, Meteor, Noonday and Reco, at Slovan City; Silver Hoard and Neosho at Ainsworth; Rosebery-Surprise, Rosebery; Sally, Bell and Revenge, Beavertell; Rambler-Cariboo, Rambler; Blue Bell, Riondal; Whitewater, Retallack; Alamo, Alamo; and Monarch, Field. The development of these mines is a very important matter to the wide district they cover. Among them there may be discovered at any time an ore-deposit of the first magnitude.

**ROSSLAND.**—The famous old Rossland camp has remained idle during the year. When the price of copper advances the large amount of low-grade ore remaining in these mines will become available once more, due principally to the possibility of separating the gold-bearing copper sulphides from the barren pyrrhotite by flotation.

#### THE WESTERN DISTRICT

In the Western Mineral Survey District the past year has been marked more by development than by production. The metal mines produced during 1922 only a com-

paratively small tonnage of concentrate from the Indian Chief Mine, the property of the Tidewater Copper Company Ltd., at Sidney Inlet, west coast of Vancouver Island.

The reason for this small production is that the Britannia and Marble Bay mines have been non-productive during 1922, and the Indian Chief was practically closed down owing to lack of water for power during about ten months of the year. While the small production is regrettable, yet when the new development work that has been done in the district is considered there is good reason for optimism for the future.

**BRITANNIA.**—The Britannia Mining and Smelting Company has shown to a marked degree of confidence in the future, because although their concentrating plant at Britannia Beach was totally destroyed by fire on March 19th, 1921, and the company's town was visited by a disastrous flood on October 28th, 1921, the management has during 1922 carried out extensive development work in the mines, has almost completed the construction of a new concentrating plant with a capacity to treat 2,500 tons of ore daily, the building being constructed of steel and concrete, has built new houses for employees, has replaced the railway bridges by steel bridges and in addition has settled every claim made against it for damages resulting from the flood. The development work at the mines has been principally continued at the "Victoria" mine on the northerly side of Furry Creek, about 2,000 feet south-easterly from the "Empress" mine.

It is expected that the new concentrating plant will be completed and ready to operate about the beginning of February next.

The Britannia Company have entered into a contract with the B. C. Electric Railway Company for electric current equal to about 6,000 horse-power to supplement the Britannia's present electric power plant.

The Britannia Mining Company can safely figure on 10,000,000 tons of reserve ore made up as follows:—broken ore in stopes 1,700,000 tons, reserves of "positive" and "probable" ore in place 8,300,000 tons. Of this quantity it is safe to estimate that a million tons of commercial ore have been blocked out in the new Victoria mine within the last two years.

On the Tide-water Copper Company's Indian Chief claims, the development work done during 1922 has been to explore more thoroughly the ore-body known as the "Price", which was discovered by diamond drilling in 1919-1920. The quantity of ore blocked out in this body represents a tonnage sufficient to keep the concentrating mill running steadily for at least two years.

**PROSPECTS.**—There has been some progress during 1922 on smaller mining properties in the Western Mineral Survey District. This has resulted in reopening old workings and extending the development work on such properties as the "Silver Tip", "Nancy Bell", "Saga", "Good Hope" and "Surprise" groups on Texada Island, the "You" group on Bedwell River, Clayoquot Sound, and on the "W W W" group on Franklyn River, easterly from Alberni Canal. The ore on the last two mentioned claims occurs in quartz veins in the volcanic rocks of the Vancouver series and the values carried by the ore are principally gold and silver. Small milling plants have been constructed on both the "You" and "W W W" groups.

On Texada Island the Marble Bay Mine is closed down indefinitely. Although a body of copper ore of good grade was opened below the 1700 level, being developed by diamond drilling, it was estimated by the management that owing to the low price of copper it would not



be profitable to attempt to mine the ore because of the quantity of dead work necessary to be done.

The development work on Texada Island during the past year was confined to that done by Lee, McDonald and McMillan on the "Nancy Bell" and "Silver Tip" claims; also, that done by Jack McConville and associates on the "Saga" mineral claim where a large Ross mill was constructed and operated for a few weeks.

The ore-bodies belong to the fissure vein type; the metallic content of the ore is principally gold and the gangue material is quartz. These veins occur in porphyrite country rock which is typical of the formation generally through the centre of Texada Island.

In other portions of the Western Mineral Survey District the work carried on in and around metalliferous prospects has been confined generally to the regular annual assessment work. The most important results were obtained on the "Gabbro" group of mineral claims on Jordan River about forty-two miles from Victoria where, under the superintendence of George C. Winkler, there were exposed several promising copper sulphide ore-bodies in mineralized zones of considerable extent and notable regularity.

**COAL.**—In the Western Mineral Survey District coal mining has been up to date the most important mining industry. During 1922 the production of coal from the Vancouver Island mines will have exceeded that of 1921 by about 170,000 tons. The production of coal during 1921 from Vancouver Island mines was 1,625,931 tons; the production during 1922 up to the end of November has been 1,639,262 long tons to which may be added 158,000 tons as an estimate of the production for the month of December, making a total for the year 1922 of 1,799,262 long tons.

It is gratifying to note that there has been complete harmony between the operators and the employees in the coal mining industry on Vancouver Island during the past year; agreements have been entered into for the continuation of such harmonious relations during the coming year.

The export trade to the United States will probably be considerably reduced for some time at least owing to the fact that the United States Government on the 26th of September last, put into effect the Fordney Tariff Bill which placed bituminous coal on the dutiable instead of the free list.

Under the Fordney act Australian coal is imported into the United States free of duty. Up to the present time Australian coal practically commands a monopoly of the markets in California and Oregon and is gradually replacing other coal in Seattle and Tacoma.

While the use of fuel oil on the Pacific Coast has seriously affected the market for the bituminous coal of Vancouver Island yet it is anticipated that the introduction of Australian coal will in future prove a very much more serious handicap against Vancouver Island coal than has the competition of fuel oil. About the only remedy against the introduction of Australian coal into the Pacific Coast States would be the removal by Canada of the import duty on bituminous coal into the Dominion, which action would be followed by the automatic removal of the import duty on Canadian bituminous coal into the United States.

#### NORTHWESTERN DISTRICT

The northern part of the Pacific coast of British Columbia owes its present prominence mainly to two mines,—the huge copper deposits of Hidden Creek that supply the Granby Consolidated smelter at Anyox,

and the Premier gold-silver mine at the head of Portland Canal. There are numerous properties under development, some of which promise to make mines; but the record of mineral production for 1922 rests upon these two.

**PREMIER.**—The marvellously rich ore-shoots of the Premier mine have now yielded a return to shareholders of about three million dollars. The ore is so phenomenally rich that it has required comparatively little mining to take out the ore that has given this net profit. The mine is privately owned, and no statement as to ore reserves has been made public. Already the rich ore-shoots have lasted longer than most rich bonanzas.

There has been feverish activity in an effort to find a second Premier in the area north of the town of Stewart, but so far without success. On the Big Missouri property a considerable amount of development work has been done, but its future is not yet assured. There are a number of very promising prospects that are undergoing systematic development.

**ANYOX.**—To the Anyox smelter is due the credit for the Province's 1922 production of copper. It is one of the few plants on the continent, or in the world, that conducted smelting operations continuously throughout the year, in the face of discouraging conditions. This was done by virtue of some outstanding metallurgical work, based on successful scientific research. The Granby company is now in a very sound position by reason of the initiation and resource of its engineers.

**ENGINEER MINE.**—The well-known Engineer Mine, now free for the litigation that has hampered its development until recently, was thoroughly examined during the summer by representatives of eastern Canadian investors. The result of this examination has been, presumably, unfavourable, for no further move has been made to develop the property. It is, apparently, like the majority of bonanza showings, and thereby unlike the near-by Premier Mine, in that its early promise has not been fulfilled.

Everything considered, British Columbia's mineral industry is in a very healthy state. There are a number of outstanding mines of world-wide fame; there are numerous smaller mines, scattered over a wide area; there are an unusually large number of prospects under development, among them a considerable proportion of unusual promise; and prospectors are bringing to light new deposits that will ensure an ever-increasing mineral production for the province.

In the legislature of South Australia a government bill has been introduced to abolish compulsory arbitration. The Board of Industry and the Industrial Boards are to be retained as a means of adjusting labour disputes.

It is proposed to re-examine the famous Thames placer field of New Zealand, which yielded \$35,000,000 from a small area. It is stated that exploration with modern methods and with the thoroughness now possible is certain to be remunerative.

The total production of Gold on the Rand, South Africa, since it was opened in 1884 has been approximately £700,000,000, or 163,250,000 ounces. The Crown Mines, the largest individual company, has contributed 13,000,000 ounces to this total. A total of £154,000,000 has been paid in dividends throughout the field.



# The Mineral Industry In Manitoba, 1922

By J. S. DELURY \*

During the past year there has been the customary activity in the production of non-metallic mineral products, part of which are gypsum, stone, cement, clay products, lime and sand lime bricks. Production tables are not yet available for the year but it is expected that the normal increase that has been shown during the years following the war will be recorded again for these materials. On the other hand, there has been no production of the metals. The production of these in Manitoba was confined to a four year period, 1917-1920, during which time the following were produced:

|              |             |
|--------------|-------------|
| Copper ..... | \$2,039,942 |
| Gold .....   | 179,844     |
| Silver ..... | 57,667      |

As production totals, these figures are small as compared with most of the other Provinces, but they will serve to indicate that Manitoba has some possibilities as a metal producer. While there has been no production, there have been some activities in most of the metalliferous areas of the Province during 1922, namely in the Flinflon, Copper Lake, Elbow Lake, Rice Lake and Bird River districts.

It will be recalled that nearly 17,000,000 tons of copper ore carrying low values in gold and silver were blocked out by diamond-drilling on the Flinflon claims during the past few years. Exploration work was continued on the same deposit until the fall of the past year, chiefly in the way of further drilling. It is reported that a body of high-silica fluxing rock of sufficient size to meet smelting requirements has been found by representatives of the Flinflon interests on Tartan Lake. Dr. Alcock of the Geological Survey, Department of Mines, had a party in the Flinflon area during the summer, engaged in detailed geological work.

Similar operations to those on the Flinflon deposit were conducted on two properties on Copper Lake by parties representing Cobalt interests. Diamond-drilling was done on one of the large deposits of sulphides found in that area as well as on a large low-grade quartz vein. Several mining interests had representatives in the Elbow Lake area during the summer, doing work on the Murray claims as well as on several small veins that have spectacular showings of free gold. Some active prospecting has been going on in many parts of Northern Manitoba, particularly in the vicinity of Herb Lake. Some new finds of gold are recorded from this area. The Apex group of claims on Herb Lake was carefully sampled during the summer for some Cobalt interests and as a result, some steps towards active development work on these claims are expected. The Rex Mine on the same lake was examined for several different concerns. There is unanimity of opinion that the Rex will make a profitable small mine, and only the difficulty in arranging terms is deterring its operation. No work was done on the Bingo group of claims until November when sinking operations were resumed. The shaft is now down to

about 200 feet. Money was raised in London for its development, new machinery has been ordered and an active development program has been arranged. The principal showing on this group of claims is on the Bingo where a number of small parallel veins occur fairly close to each other. The shaft was sunk on one of the most promising of these, the others being within 50 or 100 feet from the shaft, across the strike. Values in a 6 to 10-inch quartz vein run about \$150 fairly consistently in the shaft and on the surface. No attempt has yet been made to cross-cut to the other veins from the shaft, but it is planned to do this when the shaft is deeper. There are some other promising properties in the Herb Lake district, which will probably have to wait for results from the Rex and Bingo developments before it will be possible to finance them.

Some very rich silver samples, said to have come from a rather inaccessible part of Northern Manitoba, have been shown in Winnipeg. A sample seen by the writer showed abundant finely disseminated silver in calcite. Its unlikeness to any of the Ontario silver ores makes the story of its finding and source all the more credible. It is understood that some parties have taken to the field this winter in search of the silver deposits, or to be on hand for the spring search and locating.

One party prospected on Knee and Oxford lakes during the summer and brought back some samples that indicate the presence of a considerable body of low-grade copper ore on the south shore of the latter lake.

The Selkirk Mining Company, financed by a strong group of New York capitalists, has been doing steady underground development work on the Luleo group of claims, which are located in the Hole River area of the Rice Lake district. The work is being done on a large gold-quartz vein which occupies a shear zone in granite. Over 800 feet of work has been done in sinking, drifting and cross-cutting. Values so far obtained are sufficiently good to warrant further development, and this is promised. There have been some small attempts made at the milling of small high-grade deposits of gold-quartz in other parts of the Rice Lake district during the summer, but there seems to be a tendency on the part of those interested in this district to wait for the results of the work being done on the Luleo vein. This deposit is one of the most promising in the district and its operation is guaranteed should the results from development continue to be encouraging. Dr. Wright of the Geological Survey, Ottawa, spent the summer with a party in the Rice Lake district.

Considerable interest has been taken during the past few years in the Maskwa River and Bird River areas where copper-nickel deposits, similar in some respects to those at Sudbury, were found at several points. Little work beyond that required as assessment was done during the year. However, some serious development work is planned for one of the deposits. A diamond-drilling outfit is now in the area ready to commence operations on the Devlin-Martin claims. The extent of drilling will depend on developments as the work progresses, no definite pro-

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gram of work having been outlined beyond the first thousand feet or so.

Nothing has happened during the year of particular interest in connection with the non-metallic mineral industry in the Province. Perhaps the most interesting feature was the development of a granite quarry on the Greater Winnipeg Water District Railway, about seventy miles from Winnipeg. Large blocks of very fresh granite of a great variety of colors and grains have been taken out and a growing market is

being found for the products, locally and in many parts of eastern Canada and to some extent in the United States. Some search has been made for oil in the vicinity of Stoney Mountain and Stonewall. One well was drilled and results from it do not indicate any particular merit in the type of divining rod which was used. It is understood that some work has been done in the Turtle Mountain area in an effort to find workable bodies of coal among the Tertiary lignites which are known to exist there.

## Mining Investments In 1922

By ALEXANDER GRAY\*

That is the subject assigned by the Editor. His intentions are more complimentary than humane, since it calls for a complex role, for which the parquet may have bouquets—and the galleries something worse than cat-calls.

"Investments" in mining, it may as well be admitted, lose much of their attractiveness when the strictly investment stage is reached. Gradations from Speculative Investments, to Gambling on the chance of a prospect developing into a mine, are incapable of definition by any but the academic. All the Crystal Gazers on earth, all the aggregations of Mahatmas, all the Occult Sciences visioned by Blavatsky, Lodge and Doyle, cannot determine the etherical partition separating risk from certainty. Even Schawb, greatest of Steel Masters, and a successful speculative investor, avowed that when a stock arrived at the dividend stage, it lost much of its attractiveness. At the Rand, most consistent of gold fields, when earning capacity became stabilized, speculative funds became unresponsive. Therein are the dangers of dogma and the putrescence of speculation that can be overdone where ordinary foresight would obviate a great deal of the mischief wrought by those who magnify or misrepresent. Skepticism to extreme never yet brought reward, any more than will over-speculation.

Emphatically it may be stated that Canadian mineral resources have beckoned to capital. They are not to remain comparatively inactive and useless assets. Of unquestioned amplitude and diversity, they are providing more credit than has been realized by those who consider mining to be a menace to small savings and large bank balances.

Ontario having produced nearly a quarter of a billion dollars in Nickel and Copper; about \$210,000,000 in Silver and approximately \$108,000,000 in Gold; British Columbia having added about three quarters of a billion to the wealth of nations from its mines, placers and non-metallic minerals, the basis of credit is not lacking by any manner of means.

Cobalt dividends approaching \$100,000,000—a quarter of that from the Nipissing, over \$11,000,000 from Coniagas, nine and a quarter millions from Kerr Lake, \$7,500,000 from La Rose, over \$6,000,000 from Crown Reserve, and five and a half millions from the Mining Corporation of Canada, irrespective of what the companies incorporated in it paid prior to their being merged, another five and a half million from McKinley-Darragh,—lend fervor to the hope that "another Cobalt" will be found before the present Cobalt becomes passive.

It was those companies—all classified at one time as wild cats or rank speculations,—that caused a furore and wrought havoc with public confidence. "To be something we are not: to have something we have not," wrote Sir Richard Temple, "is the root of all evil." The cluster of Cobalt's gems undoubtedly inspired more speculation than

was justifiable, but whatever of speculation characterized central Cobalt has been speculatively profitable in South Lorrain and elsewhere, although the Montreal River has yet to dilute early fictions with more than a dash of fact.

### *Re-investment from Cobalt*

Precedence is given to Cobalt and its influences—notwithstanding the general antipathy once manifested toward the Wonder Silver Camp—because the mining investments of 1922 in greater part owe their origin to Cobalt and its millionaires. Wealth won from the silvers has been distributed throughout the Northland, the Northwest and the Pacific territory. With \$24,720,000 turned over to its shareholders, and four more ready, Nipissing has tried to find some new deposit conforming to its standard. As a profit-sharer it would like to maintain its front rank position; so it made a speculative investment at Claw Lake, drilled it, and also a portion of Kirkland Lake—but did not find what it wanted. Coniagas devoted itself to Newray, Matachewan and Larder Lake, eventually reverting to southeastern Coleman, where there is enough silver to make it interesting. Mining Corporation of Canada, always alert, extended its lines at the Flin Flon, concentrated on its increasingly important areas in South Lorrain, and was open for engagements throughout the year. Keer Lake interests entertained the Goldale properties at Porcupine, where the prospects promise a return upon a speculative investment. Buffalo money and its influence made a mine out of the Teck Hughes, at Kirkland Lake. Crown Reserve funds may create a credit mark for Larder Lake, a result that would be deserved, for this company has been vigilant and left nothing undone toward acquiring a healthy place for a reproductive speculative investment. Beaver money made Kirkland Gold a producer. Temiskaming as well as McIntyre, put Blue Diamond Coal where it sees a profit. Although Trethewey is affiliated with its neighbor at Cobalt, its life is prolonged in the Castle-Trethewey at Miller Lake.

Clearly, therefore, the speculative investments of 1922 were largely of Cobalt's making. The greater portion of Hollinger Consolidated capital came from La Rose and Princess. At the end of the year Hollinger—the speculation of 1909—had paid almost \$20,000,000 in dividends, and there was more than \$7,000,000 in surplus, unless the purchase of the Schumacher encroached upon that. Denison money, made to some extent at the Buffalo Mine, gathered more in the Dome and Dome Extension. McIntyre during the year took an option on the Schumacher Veteran Claim adjoining the Dome. Had Nipissing taken the Rochester Veteran Claim, the roster of Cobalt companies or individuals interested in gold properties would have been reinforced. For the same reason, it would have strengthened Elbow Lake had individual Hollinger Directors and officials continued their explorations there.

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*The Gold Developments*

The logic of outputting events, first at Cobalt, then at Porcupine and subsequently at Kirkland Lake, sustained fully those who profited most therefrom in their optimistic and prompted speculative investment of domestic funds. Reinvestments and the results, the knowledge that Canada as a whole has mineral wealth comparable with, if not exceeding that of other mining countries, have made 1922 memorable in spite of adversity in other directions. American mining capital and business interests employed their surplus capital in Canada. It is in the Bidgood, the Harvey, the Martin and other of the newer ventures. Without being invidious, the paramount transaction of the year was the transfer of nearly three miles of potential producing country at Kirkland Lake to Continental Mines, which also acquired the Colonial and Silver Cliff properties at Cobalt. The moving spirits in that undertaking had retreated from anything of the sort in Northern Ontario, and some of them had sent innumerable propositions to the scrap heap. They were trained to "take no chances," had to have a double cinch on what money was sought from their principles or themselves. Speculative investments had to be amended to suit conditions, before they relaxed their grip upon option or purchase money. They remained aloof so long from Northern Ontario, they were thought to be petrescent, until it became obvious even to themselves that they were at the wrong end of the telescope. Hence the acquisition by them of the largest block of ground in close proximity to the producing section of Kirkland Lake, and a campaign that has impressed other groups of capitalists.

Had Continental Mines been organized on the impulse and relied upon "washing" machines to procure capital, the departure would have attracted less attention. There were purchase commitments, prospecting costs, and a development program at Kirkland Lake, and the taking over of the Colonial and Silver Cliff at Cobalt was a double capital charge, involving a three-compartment shaft to a depth of 800 feet, where the O'Brien-Colonial contact vein is counted on to make an investment out of the speculation. Meanwhile a projection at Kirkland Lake, substantiated by the discovery of an ore-body, makes the distinctive speculation of 1922 in that field, prophetic for 1923. Moreover, closely affiliated principals not only are pleased with their Continental prospects but they have become identified with one of the Rouyn Township, Quebec, areas, where the showings compare favorably with those of other fields. London has a small part in this Quebec development. Apart from that, it may be interpolated, London confined its attentions to Northern Tisdale and Matachewan. The latter now may make a demonstration, as hydro-electric power will be available. Somehow, though, New York is quiescent as to its Matachewan holdings, and \$360,000 in estimated ore reserves. London, too, yielded the "V. N. T." right of way to Toronto share dispensaries.

Pittsburg capitalists have earnestly proceeded with the development of their Nighthawk Lake areas. They have acted on the belief that they have a mine entitled to a mill, tonnage and widths being sufficient in their judgment. While the capital is the largest of any gold mining company in the district, excepting Hollinger, the area is extensive, and the chief owners are most optimistic regarding it. Their own money has been forthcoming; they paid off certain of the vendors, and that is evidence of their confidence. A recent offering of further shares had for its object the provision of milling equipment and power. As it antedates Porcupine, Nighthawk Lake is due for the run it is having. In that the Pittsburg people privately subscribed a considerable amount before seeking public support, they are entitled to special commendation.

Deloro Township and areas around the Dome came in

for a share of notice. The Paymaster, formerly the Standard, under Boston auspices, is said to have a porphyry contact situation with some spectacular ore. There was a porphyry contact years ago, that was found and lost. The latest is vouched for by disinterested eye-witnesses. The McKay and Imperial are alleged to be under option. The North American Gold Corporation holding, originally the Ankerite, has New York Headquarters and a Delaware charter, and expects to start operations. Because of local conditions and Dome developments, the Ankerite has possibilities, apart from the tonnage developed and indicated, and aside from the prejudice against iron carbonates, which really seem to form but a small portion of the mining area.

While the adventitious regard Deloro as likely to be brought along when capital and cheaper power are more plentiful, the patrons of Shining Tree are as persistent and impertrurbable as those of Lightning River and other sections of N. E. Ontario. Mr. Cyril Knight lent the weight of his professional opinion to some of Lightning River. Dr. W. Harvey Weed was more emphatic regarding Shining Tree, where the Tonopah Company has made the greatest effort yet to make a mine. Beyond that, the district has had more "froth flotation" than fructification. It has survived all nursery years and is thought to be on the eve of more conclusive determinations.

*Progress in British Columbia*

Money and good management are making British Columbia a centre of activity from boundary to boundary. Most of the new money is coming from outside Canada. The Government and Minister Sloan are co-operating by assisting with better transportation facilities. The Premier Mine has been an inspiration to the whole country.

There are other properties obtaining money for development. Because of the values being obtained at the Indian Group, Portland Canal, the hope is that much larger operating facilities will be needed before the new year is far advanced.

An economic error of judgment obsessing many is the assumption that early indiscretions cannot be outlived. We must not be unmindful of the great progress that has been made in numerous instances in spite of initial financial operations that seemed enough to snow under the respective properties forever.

If evidence were lacking of what the mineral industries of Canada are capable, the preliminary figures giving the value of the output of the Province of British Columbia supply the proof. The year of depression in other lines has been a year of substantial progress in the province's mining industry. In 1922 the mineral output of British Columbia was estimated at \$32,167,463, a most satisfactory gain of \$4,100,822. The feature of the total is the continued progress in precious and base metal production, that of gold amounting to a net gain for the year of \$1,079,462; in other words, the gold output now has receded to \$4,116,815. Silver gained \$2,422,953, bringing the aggregate for the Province to \$4,034,154. Notwithstanding Granby activities, copper value was lower, and coal, singularly enough, showed an increase of \$377,095.

Analyzing those figures, and having in mind that the Premier company was credited with shipping 49,205 ounces gold and 1,572,951 ounces silver in 1921, it need hardly be emphasized what influence the production of that remarkable property had upon the total of the Province. It is semi-officially intimated that the Premier gold production in 1922 was 137,000 ounces gold and 4,500,000 ounces silver. No comment is called for. The Blue Ribbons are there for the management, the mine and men who had the nerve to develop and equip this Leah of recent years.



Meanwhile the interests have been seeking investments in the immediate vicinity; most of the ground is acquired. That is why influential owners are freer to talk. Montreal and Toronto people of financial and mining experience have been pursuing a constructive policy at the Indian Mine, which is approximately 1500 feet removed from the northern line of the Premier. While there have been numerous new ventures during the year, the Indian at-

tracted most attention because of its sponsorship and the reports emanating from Mr. Turner in charge. Three adit levels have been opened up, and raises and winzes are being carried on. Instead of a problem, of which Portland Canal District has presented plenty to every company there, the indications are that the Indian has greater possibilities than pioneers could or would concede to it.

## Recent Developments in Metallurgy in Canada

By G. J. MACKAY\*

The practice of technical journals in viewing at this time of the year the status of, and developments in, the several industries has become well established. Many of us welcome the January issues in order to find this retrospective view set forth in brief and readable form. It is an arm-chair pleasure to wander lazily with the contributor over some industrial field and dreamily to congratulate ourselves on how much more we know about certain phases touched upon than he apparently does.

A brief backward glance over some of our Canadian metallurgical enterprises during, say, the last two or three years may not be without interest. Progress has been made in nearly every quarter, much of it unrecorded except indirectly in the financial success of our mining enterprises.

### *Copper*

The Granby company was one of the few copper producers in North America that continued operations throughout the depression of 1921-1922. In the summer of 1920, under the new management at Anyox, drastic changes in the smelting practice were introduced; the reduction in the amount of coke and barren flux used did its part toward keeping costs down. The three cuts in wages agreed to by the employees, and the improvements made in the power supply, were further important factors.

At Trail the plans of the Consolidated company to erect a concentrator to treat Rossland ores and so renew the youth of these mines has been held in abeyance. Until that programme has been carried out and the copper market has further improved, the new rod mill will not come into its own as a source of strength in Canadian mills.

### *Zinc and Lead*

The sums spent on a competent research staff and large experimental plants at Trail have been more than justified by the success attained with the Sullivan ore. The treatment of this finely disseminated mixture of sulphides of zinc, lead, copper, and iron has been mastered. Selective flotation, with a little assistance from tabling of the middles, is giving satisfactory concentrates for the electrolytic zinc plant and the lead blast furnaces. The refinements introduced in the treatments and the additional equipment installed in the zinc and lead plants have made possible a reduction in costs of power and a very complete recovery of the lead, with a great reduction in the former loss of zinc. These improvements have enabled the Company to share the benefits with the mine operators of British Columbia, as is shown by the amended schedule of treatment rates now in force.

The surface equipment of the Kingdon mine at Galetta consists of a mill and a Newman ore-hearth smelting the

high grade galena concentrate produced. This is an example of a small mine with a complete and model plant that has continued to operate profitably through the recent depression in the metal markets. A new blast furnace has just been added to the equipment, which is now complete in every detail.

### *Gold*

The mill men at Porcupine have not rested on their laurels, but have adopted new ideas from the experience of others or, more often, used their own ideas to meet the changing nature of their ores with depth or to avail themselves of new economies in treatment.

At the Hollinger, the use of a ball mill in parallel with the stamps demonstrated that the time for a change had come. A carefully conducted series of tests of two ball mills of different types and a rod mill has led to the decision to replace the stamps by rod mills. Oliver filters have recently been installed to reduce the loss of dissolved gold and cyanide in the residue as discharged from the continuous decantation plant. Here, as at most of the mills in Northern Ontario, a Crowe de-aeration unit is in use.

In some gold camps, fashion rules in mill practice and equipment. This is not the case at the Porcupine mills and perhaps least of all at the Dome. The metallurgist in charge there has his own little pet experimental plant, which is seldom idle. The efficient work done is more than creditable in a mill that has been hashed about as the Dome mill has been. Eight years ago, a sand leaching plant was added to give greater treatment without added crushing. Recently all-sliming has been again adopted, the ore of to-day requiring fine crushing. Amalgamation is adhered to and even blanket strakes, or their equivalent, are used to retain liberated gold that has failed to amalgamate. High extraction and low costs govern in the Dome mill regardless of appearances. Another evidence of untrammelled judgment is the change in the treatment of the gold precepsitate; the litharge smelt-cupellation has been replaced by the "old fashioned" acid-wash—calcining—melting process, with very satisfactory results.

About three years ago at the McIntyre mine, graphitic schist was met with in parts of the ore-bodies and caused some apprehension. Its presence in gold ore is always accompanied by premature precipitation in cyanide treatment. Undaunted by the fact that this difficulty had never been satisfactorily overcome, the metallurgist in charge attacked it. By a lengthy series of laboratory experiments followed by large scale tests, it was found that grinding in water containing a little light mineral oil, dewatering, and cyaniding was the remedy. The oil coats the freshly broken particles and prevents the adsorption of the reducing agent that causes the precipitation. An addition to the mill was erected last summer to house the

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apparatus required by the new flow sheet and to increase the total capacity. However, underground development has proved that the graphitic schist is local, the parts of the ore bodies affected being of no great extent.

In the Kirkland Lake camp, five new and more or less model mills are at work. The rumble of the stamps is missed; intermediate crushing is done in ball mills. All slime treatment is carried out by means of Dorr equipment. The thickness of the pulp in the agitators and the length of agitation are striking features in some of the mills. For tonnage, the former is necessary to permit of the latter. The long agitation is required owing, possibly, to the presence of gold tellurides.

**Stamping up.** (1) It seems that the stamps have had their day. Rolls and ball or rod mills have conquered them even on rather hard and tough ores. (2) The efficiency of tube mills makes fine grinding profitable on most gold ores. (3) In Northern Ontario amalgamation before cyaniding is not favoured. Is this good policy or not? At any rate, to install plates would now mean to train a new generation of amalgamators.

#### *Silver*

Cobalt is well known for the excellence of its concentrating practice and for the remarkable work that has been done in devising means for the successful cyaniding of its very refractory ores. Of more general interest is the very fine grinding that is being done in its cyanide mills of late years. The economic limit of fineness is not reached with a 200-mesh product, and the sand from this is re-ground. Perhaps such fine grinding is justified in the case of few other ores except the tellurides of West Australia. At Cobalt the use of the bowl classifier and of the tube mill with steel balls replacing pebbles, has made this an economic success. An exhaustive series of tests of an apparatus that marks a radical departure in fine grinding practice is nearing completion and will yield something of interest to gold and silver mill operators.

The mill at the Premier silver-gold mine in northern British Columbia has been in operation long enough (since July, 1921) to prove its efficiency. Flotation and cyaniding are employed on an ore containing many refractory silver minerals. The concentrate is carried to tide-water by an aerial tramway over eleven miles long and is shipped to Tacoma.

#### *Nickel-Copper*

During the greater part of the last two years the smelters of two of the nickel companies have been closed and the third has been working at low capacity. The companies have been devoting their energies to devising means of producing pure nickel and nickel alloys. They are now turning these out in quantity and are seeking new markets for them to replace the armament uses of nickel. The Mond Nickel Company is making pure nickel in its plant at Clearfield, Pennsylvania. The British-America Nickel Corporation is producing pure nickel at its Deschenes, Que., refinery by means of a second electrolysis. The purified metal is highly malleable and welds perfectly to steel. The International Nickel Company is making monel metal and other nickel alloys in its plant at Huntington, West Virginia. All its refining will, in future, be carried out at Port Colborne.

The Mond company is doubling the size of its flotation and Dwight-Lloyd plants. This will give a lower silica and higher iron blast furnace feed, which will be self-fluxing.

The British America Corporation has run its smelter at Nickelton on rather unusual lines. A heavy duty was put

upon the converters by using siliceous ore in them instead of barren quartz; the great quantity of slag resulting was returned to the blast furnace where it acted as a very satisfactory flux; this entailed the handling of a great deal of slag but gave a large matte output from a single blast furnace and its converter. At Deschenes the Hybinette electrolytic refining process, considerably modified, has been used. This gives casting copper and high-grade nickel and leaves the precious and rare metals in a concentrated and easily treated product. It is said that the company has secured contracts for a large output of nickel and will recommence operations shortly.

The possibility of the differential flotation of copper and nickel sulphides from finely ground Sudbury ore is attractive and has been receiving the attention of investigators for the last few years. From the nature of the occurrence of the nickel sulphide, it is a difficult problem. The possibility of roasting and wet treatment of these heavy sulphide ores seems still more remote, especially as the nickel sulphide is averse to treatment that will make the nickel soluble on a commercial basis. When the great nickel corporations have solved their present problems of new works, they may turn their attention more definitely in the direction of new methods of treating their ores.

The Deloro smelter continued to operate its silver and arsenic department during the recent lean months. The Cobalt plant was re-opened in June after a year's shut-down. Additions for the manufacture of insecticides and of cobalt salts have recently been brought to the producing stage. The whole plant is now working at capacity and turning out a number of finished products of cobalt, nickel, and arsenic.

#### *Iron and Steel*

The question of a domestic iron ore supply is only secondary in Canada at present to the supply of fuel for the central Provinces. The Ontario government is seriously considering the pros and cons of granting assistance to iron ore producers and the British Columbia government is considering the possibilities of a Coast steel plant.

The practicability of the commercial beneficiation of our low-grade magnetic ore, which is known to be available in large quantity, and the smelting of the resulting produce, are two pressing questions in Canada. The concentrating-sintering plant at Babbitt, Minnesota, is a centre of interest for Canadian iron and steel men. The question of just how the sintered concentrate will act in the blast furnace is also of the greatest interest.

The problem of the application of the electric furnace to the smelting of iron ore or concentrate in this country is likely to be left unsolved for many years to come. When we consider the dearth of fuel and the abundance of water power in our industrial Provinces, we are almost envious of the success attained with the electric shaft furnace in Norway and Sweden. However, a comparison of conditions is not encouraging. There, a higher grade of pig-iron than we can hope for is produced, power is much cheaper than with us, and a saving in charcoal is a greater economy than a saving in coke.

Canadian metallurgists have had their full share of difficult problems. These have been met by alert, resourceful, earnest men. The patient labours of trained investigators have brought uniform success. The achievements of these men in the past give us confidence for the future, with its still more refractory and low-grade ores and its ever-changing market conditions and industrial demands.



# Mining Methods in Canada

By S. N. GRAHAM\*

From year to year we have become accustomed to reading, in the annual review numbers of the technical journals, of the great strides and improvements made in metallurgical methods and processes. The metallurgist is impelled to make these improvements by the ever-increasing pressure of competition, by changing economic conditions, and by the present necessity of treating ores that were at one time considered too rebellious to handle. His researches have been aided by the fact that in the laboratory he can make a large number of experiments in a comparatively short time. Considered from this viewpoint, the miner works under a great handicap. He cannot make experiments in the laboratory, but must have them made in the mine. Here he labours under the difficulty of having daily to produce the required quantity of ore, and no experiment may be allowed to interfere with this. Furthermore, if he has the temerity to try an experiment with the object of improving his mining methods, he must carry on his experiment with such large quantities and on such a large scale that the result of a single test may not be known for months or even years. It is not surprising, therefore, that along with a review of metallurgical improvements there is not always a review of mining improvements. Just as the experimenter is handicapped, so also would be the reviewer.

## *Shrinkage Stopes Almost Universal*

From what has been said it must not be inferred that mining methods are not being improved. The exact opposite is the case; but the curve of progress does not show any steep or sudden peaks. One has only to read the description of mining methods as given in such classical books on mining as those of Le Neve Foster and Ihlsing, and then look at the chart of modern mining methods, prepared by the American Institute of Mining and Metallurgical Engineers, to see that really tremendous advances have been made. The time-honoured open stilled stope and the square-set stope, with their ever-increasing timber cost, have practically disappeared. The hard-worked mine superintendent has evolved methods that permit the safe and economical mining of the most difficult deposits and that overcame the disadvantages of these two old systems.

It is appropriate to point out here that nearly all Canadian ore deposits develop into what may be called "hard rock" mines. While this condition makes the ore harder to break, it is, in part at least, compensated for by the fact that the walls are unusually strong. This, coupled with moderately wide, or wide, ore-bodies of steep dip, has made the "shrinkage" method a favorite in our mines. So common is this method that it may be said to be typical of Canadian mining practice. While it is a type, it is not a "form" method, because nearly every mine shows minor variations. These are due largely to differences in the dimensions of ore-bodies or ore-shoots, and are characteristically shown in the way access is obtained to the stope for men and material. One very striking variation is seen in the wide ore-body of the Creighton mine where the length of the stope is transverse to the strike of the deposit.

## *Sub-Level Stopping*

While shrinkage stopping has been mentioned as a characteristic method, it is not applicable to all deposits; but when the dip is not too flat it seems the most suitable. For

flat dips, when gravity will not move the ore to the drifts, the drag-line scraper has been adapted to underground use, as in the Sullivan mine. Where the ore was required to be used immediately, the sub-level stoping method was successfully used in the Magpie mine. The whole-sale bench mining now being tried out at the Hollinger mine is a most interesting experiment. It shows that no efforts are being spared to improve methods in Canadian mines.

Both drift pillars and stulls are used for protecting the drifts, the particular method adopted depending on the grade of the ore. When the grade of ore in the pillars is sufficiently high to ensure a profit after timbering, then stulls are used. There is thus an economic limit that has to be worked out for each individual stope, as has been done at the Hollinger mine, where both methods are used. Of course the pillar ore may be recovered ultimately; but in some cases the expediency of recovering it may be considered with a question mark after it. However, the pillars can be mined, as witness the very successful pillar-drawing at the Creighton mine.

Thus continued practice with the shrinkage method has enabled the mine superintendent to overcome many of its disadvantages. Sad experience has proved that the ore drawing requires close supervision; but, given this, there results less trouble and fewer accidents from ore hanging up over the chutes or box-holes. Some disappointing results show also that close supervision must be given to ore breaking in the stopes. If this is not done a very large factor for waste dilution must be used. On the other hand, if too much caution is used some stopes will require sweeping down and the ore left in the walls will have to be mined. Unless the ore is high-grade this does not pay. Low grade ore left in the walls is absolutely lost.

## *Careful Sampling*

Partly as a result of this last feature, a visitor is impressed by the extremely close and careful stope sampling seen in most of the mines. Nearly every bench is channel sampled, and drill-hole samples are taken from the walls at regular intervals.

This close supervision of underground work may be said to be the greatest modern improvement in mining. Such supervision, however, loses much of its value unless careful records are kept so that the inferences made from comparing records may be certain, and not mere guesses. The foreman, or shift-boss, must therefore be a man who, along with his other practical qualifications, is capable of keeping proper records and appreciating their value. Whether due to a demand for this type of man or because other engineering positions are hard to obtain, the fact remains that now one finds many young technically trained engineers working as foremen and shift-bosses. If these men have passed through what may be called a working apprenticeship as miners, as most of them have, then they should make most efficient foremen. Besides being of a high type of intelligence, their engineering training develops a sense of justness and fair dealing that is the most essential requirement for the successful treatment of labour. With such material to select from, men with both technical training and practical experience in handling mining operations and labour, Canadian mining companies have a splendid supply of capable and efficient superintendents and managers.

\* Professor of Mining, Queen's University, Kingston, Ont.



### *Geologists Direct Exploration*

An official now found at nearly every mine is the mine geologist. It is a commonplace to say that the more simple, easily found, and easily worked ore deposits are exhausted. The deposits now worked are more complex both in physical and geological features. It certainly points to improved conditions and to enlightenment and broad mindedness on the part of mine managers, that they appreciate what a mine geologist is capable of doing. In many cases it is he who now prepares, for approval by the manager, plans for exploratory work. Just how much he may gain or save for his employers is often incapable of direct proof. However, he is often enough able to prove direct saving of money more than sufficient to justify his existence.

One of the most obvious results of the mine geologist's labours is the construction of mine models. Whereas some years ago these were more or less a curiosity, they are now found at nearly every mine. The glass plate type of model seems to be the favorite. These are usually made up of horizontal plates on which the principal workings and geological details are marked. However, vertical sheet

models are also used where this type is better adapted to show the geological structure, as at the McIntyre mine. Such models are of the utmost value in aiding those directing the underground work to visualize the ore body and the geological conditions surrounding it. This must undoubtedly lead to more intelligent prospecting and exploratory work.

But the mine geologist's work is not confined to directing underground exploration, for his aid is being more sought in opening raw prospects and in prospecting favourable territory. An example of this is seen in some work done east of Kirkland Lake during the past summer. Here surface trenching was carried on under the direction of a geologist. The amount of trenching done in following up promising leads would indicate the belief that, for preliminary work, a dollar spent on the surface will give more information about a vein than a dollar spent in sinking a shaft.

We have every reason to look with pride upon the present status of Canadian metal mining. So long as the personnel of operating mines is kept up to the high standard now attained, we need have no fear for the future.

## Canadian Ceramic Industries in 1922

By N. B. DAVIS\*

The Ceramic Industries include all those based on non-metallic minerals treated by fire in the process of manufacturing into useful products. These include heavy clay wares such as brick, tile, sewer pipe; pottery, enamel ware, cement, lime, gypsum, magnesite and abrasives.

The general revival of building operations, during 1922, particularly in the larger centres of the East, had a very favourable influence, and many plants worked to capacity.

### *Heavy Clay Products*

Brick, hollow tile, sewer pipe and drain tile plants were rushed with orders, and several are still pushing out ware to meet the demand at a time when, in other years, business has slowed down. No new plants were put in operation, but a start was made by the Interlocking Tile Company to re-model the Shaw Brick Plant at Avondale, Nova Scotia to turn out Dennison Hollow Block. At Medicine Hat, Alberta, sewer pipe and stone ware pottery business showed an increase, and to take care of this some 170 car-loads of stone ware clays were shipped from East End, Saskatchewan.

### *Pottery*

The manufacture of pottery in Canada is limited to a few plants such as the Canadian Porcelain Company, Hamilton, and the General Electric Company at Peterborough, turning out electrical porcelain; the Trenton Potteries and Dominion Potteries at St. Johns, Quebec, manufacturing porcelain plumbing supplies; the Campbell Pottery at Hamilton and the Medalta Pottery at Medicine Hat, turning out stone ware articles. At Kingston, the Frontenac Floor and Wall Tile Company continued to produce vitrified floor tile, and started grinding feldspar for their own requirements. The first unit of a new electric porcelain plant was erected at Niagara Falls by a subsidiary of the Ohio Brass Company, Barberton, Ohio.

### *Cement, Lime and Gypsum*

Plants producing these structural materials all enjoyed the increased business derived from new construction. No new plants were erected or new deposits opened up.

### *Magnesite*

The Canadian Magnesite production has shown a slight improvement and an increasing market is opening up for this material, coincident with the increased use of stucco.

### *Raw Materials*

The China clay mine at St. Remi, (Huberdeau) continued to produce China clay, most of which was marketed with the paper trades. A description of the mine and developments was given in the August 11th issue of the *Canadian Mining Journal*.

During the first half of the year the quietness in the American pottery industries was reflected in reduced operations of Canadian feldspar deposits, but nevertheless there was sufficient movement to attract the interest of the general public, and a number of new prospects were tested. In the second half of the year business improved and resulted in increased shipments from the operating properties at Buckingham, Quebec, and Hybla, Ontario; and the Feldspar Quarries, Limited, started work at Verona. The Richardson Quarry remained under water, but a small gang was employed picking over the dumps. A new road was completed by the Ontario Government, from this quarry to the end of a new spur from the C. P. R. siding at Glendower.

Near Perth, Mr. A. M. Campbell opened up a promising deposit of feldspar and shipped some material. Dericks and suitable hoisting equipment were installed and stripping completed. On the Gulf of St. Lawrence at Manikauagan a large feldspar-pegmatite mass, which had been opened up a number of years ago, was again tested, and the operating company started building a suitable dock for shipping. At Toronto, the Feldspar Milling Company continued grinding feldspar for the Canadian trade, and a start was made at grinding quartz also. The increased duty on ground 'spar entering the United States has completely destroyed the possibility of grinding 'spar in Canada for sale in the United States.

\* Ceramic Specialist, M. J. O'Brien Co., Ottawa.



# Contributions to the Economic Geology of Canada, 1922

By WYATT MALCOLM, Geological Survey.\*

Most of the papers and reports published in 1922 that contribute to our knowledge of the economic geology of Canada are the work of members of the staffs of the different Departments of Mines, Federal and Provincial. This is to be expected, since these Departments are organized and maintained in a large measure for the purpose of studying the economic geology and mineral resources of the country and presenting the results to the public in published form. From time to time very valuable contributions are made by mining engineers and economic geologists employed by the leading mining companies of the country or in private practice such, for example, as that made a few years ago by the staff of the International Nickel Company of Canada with regard to the ore-body at the Creighton mine. Papers of this nature are not so numerous as might be expected from men with such remarkable facilities for varied and detailed observations. The operating companies, however, are to be commended for the readiness with which they place at the disposal of the government geologists studying various mining camps the information that has been accumulated in connection with the development of particular ore-bodies.

The main contributions to economic geology are to be found in various government reports and in the form of short papers published in mining periodicals, more particularly in the *Canadian Mining Journal* and the *Bulletin of the Canadian Institute of Mining and Metallurgy*. These two publications have been the medium for presenting to the public concise and pointed articles setting forth the results of many investigations at a very early date after their completion.

No attempt is made in this paper to make a complete survey of the contributions made during the year to the economic geology of the country. Attention will be called to a few that appeal to the writer as outstanding.

## Gold Occurrences

On account of the importance that gold mining has assumed, particularly in the province of Ontario, much attention has been given to a study of geological conditions existing in the gold mining districts and in areas where prospecting for gold is being carried on. Percy E. Hopkins presents, in tabloid form, a wealth of information regarding the extent of mining operations in a report entitled "*Ontario Gold Deposits their Character, Distribution and Productiveness*." Cyril W. Knight, in presenting the results of a study of the *Lightning River Gold Area*, calls attention to two great belts of sediments in northeastern Ontario consisting of conglomerate, greywacke, and slate in which the most important gold deposits are found. The gold deposits have an apparent genetic relation to intrusions of feldspar porphyry and quartz porphyry. His advice to the prospector is to direct his attention to the search for these porphyritic intrusions in or near the great belts of sediments and carry on intensive prospecting in the vicinity of these. A third band of sediments on the south shore of Lake Abitibi, twenty-five or thirty miles north of the Lightning River area, is considered worthy of the attention of the prospector.

In a paper on the "*Shear Zones of Porcupine*" in the *Canadian Mining Journal* J. C. Murray presents the results of observations made in this camp, particularly at the Ankerite mine. The original silicification of the schists that form the country rock of the ore deposits was but one step in the processes preceding the formation of ore shoots. Shearing and structural deformation within the zones of schisting were pre-essentials of ore making. "Where intrusive porphyry has brought about only schisting and silicification the later but prime factor is missing. Schist may and does carry gold over wide areas in non-commercial quantities but so also do other metamorphic rocks. The missing factor is supplied when in addition to schisting, shearing and deformation also have occurred.

"In such cases the schisted zones have been fractured, usually, as at the Ankerite, at a low angle to both the strike and the dip of the schist. Following this, the fractures were filled by the agency of highly siliceous, enriched solutions of deep-seated origin". Tourmaline is plentiful in the vein filling but has not been found in the schist. The pyrite of the vein filling differs in physical properties from that of the schist; it is associated with high gold content in the former but is of low gold content in the latter.

The observations made by H. C. Cooke on the Larder Lake deposits are also of much interest. The gold deposits so far discovered in the Larder Lake area lie within bodies of dolomite which were formed, according to the author, by the dolomitization of sheared zones of the country rock.

"The gold occurring in the dolomite bodies occurs wholly in the free state. The examination of thousands of feet of drill cores and of the assay values later obtained from them which were placed at the disposal of the writer by the Associated Goldfields, showed that absolutely no connection exists between the concentration of pyrite, the only sulphide in the rock, and its gold content. It was shown when describing the dolomite bodies that the pyrite was deposited during the later stages of dolomitization, along with quartz, calcite, and fuchsite. The examination of ore specimens shows that the quartz of the quartz veins in the dolomite has been crushed, with production of numerous fine fractures, and it is in these fractures that free gold has been deposited in thin leaflets. The gold is, therefore, of later age than the pyrite and quartz.

"The movement that fractured the quartz veins prior to the deposition of gold was small, as the veins are rarely seen to have been displaced at all, and never more than a fraction of an inch. It was probably, therefore, a final result of the same strains that caused the progressive fracturing of the dolomite, previously described; and the gold-depositing solutions were probably the final exhalations of the underlying body of cooling magma the solution from which, as we have seen, formed the dolomite and quartz veins."

The pre-Cambrian formations in which the gold deposits of Ontario are found extend eastward into the province of Quebec. This area was mapped by the Geological Survey a number of years ago, but on account of the increasing interest shown in the gold possibilities a more detailed study of the geology was made during the summer of 1922, attention being given particularly

\* Published with the permission of the Director, Geological Survey of Canada.



to the location of small intrusions of acidic rocks with which the gold has been found to be genetically related. The results of these investigations have not yet been published.

Reports on a number of other areas in which gold mining or gold prospecting has been carried on have been published, such as the reports by P. E. Hopkins on the Schreiber district, E. Thomson on the Gendreau district, Ontario, and by E. R. MacKay on the Chaudière River district, Quebec.

Certain results of investigations by W. A. Johnston on the placers of the Cariboo district show that in parts of Antler and Williams creeks gold to the amount of at least \$1,800,000 exists, which may be recovered in a large part by dredging. A description is given also of the placers of Cedar creek that were opened up in 1922. The gravels are older than the glacial drift. They appear to be in place, but this is a matter that is open to question. If they are in place they indicate the occurrence of an old stream channel, the continuation of which should be looked for at about the same level as the discovered gravels.

#### *Silver and Silver Lead*

The results of a re-study by C. W. Knight of the economic geology of the Cobalt mining district were published in concise form early in the year. Facilities for the most detailed investigation were given by the operating companies. In summing up the situation he says: "So much for Cobalt's past. What of its future? Let it be said at once that mining will doubtless be carried on for generations, either in or around Cobalt, or in the outlying areas of Gowganda, South Lorrain, Casey, Montreal River, and elsewhere.

"The increase or decrease of mining operations is, it need scarcely be pointed out, somewhat dependent on the price of silver. Certain mines recently closed down are known to have important quantities of low-grade ore, either broken in the stopes or blocked out. Should the price of silver ever rise to a dollar an ounce, these companies could begin profitable mining once more.

"In Cobalt itself it is not at all likely that operations will ever again reach their past magnitude. Many of the highly productive properties have, indeed, been cut by such a veritable labyrinth of drifts, crosscuts, winzes and raises that there is little likelihood of discovering new vein systems of great importance, although smaller orebodies may be found. The properties west of Cobalt lake, for example, belong to this class of highly prospected mines. On the other hand, the Nipissing Mining Co. is in a class by itself. It has 846 acres in the heart of Cobalt, and has already paid \$24,000,000 in dividends. Part of this large acreage is still unexplored, and though the discovery of important vein systems is problematical, no one can foretell what further prospecting may bring to light. As late as last summer a new vein of high-grade ore was discovered on this property.

"There are some properties which merit further development, such as La Rose Extension, Colonial, Ruby, Genesee, and others. The drift-covered areas, too north of the Violet and Chambers-Ferland are attractive from a speculative point of view. The south end of Cobalt (the area known as Southeast Coleman) merits discriminating attention, where the upper contact between the Huronian and Keweenaw will no doubt be further explored as the years go by on account of the success obtained at the Beaver and Temiskaming mines.

"In the outlying areas, South Lorrain and Gowganda offer opportunities for prospecting, and the recent promising developments at the Keeley and Frontier mines, in south Lorrain, will encourage the expenditure of more money in this area."

Results of further studies by W. E. Cockfield on the geology of the silver-lead deposits of Mayo district, Yukon, and of a re-study of Gowganda silver area by A. G. Burrows, were published during the year.

The Geological Survey has been giving considerable attention to the mapping and study of the geology of the Coast Range batholith of British Columbia and of the intruded rocks. It is in this wideflung geological province that some of the most important ore deposits of western Canada have been found. A memoir appeared recently presenting the results of investigations carried on by S. J. Schofield and G. Hanson into the geology and ore deposits of the Salmon River district, where ore-bearing solutions emanating from the granite of the batholith during the final stages of cooling entered fissures and shear zones and at favourable localities formed ore-bodies of commercial size. "The ore-bearing solutions which formed the ore bodies on Big Missouri ridge evidently spread laterally along silver horizons in the tuffs and tuff conglomerates. In other cases, as at the Premier mine, the ore-bearing solutions found the sheared contact between the quartz porphyry sills and the tuffs a favourable place for ore deposition.

"A period of folding followed the above period of primary mineralization. Subsequently, processes of secondary enrichment concentrated the ores carrying high silver values in the neighbourhood of the fault fissures."

V. Dolmage, in presenting the results of a survey made of the coast and islands of British Columbia between Burke and Douglas channels, describes the Surf Inlet and Drum Lummon mines, and G. Hanson describes the economic geology of the Upper Kitzault valley including the Dolly Varden mineral zone. Further work on the Coast Range area was continued during the summer of 1922 by Dolmage and Hanson in British Columbia, and by Cockfield in Yukon territory.

#### *Petroleum Exploration*

On account of the interest that continues to be shown in the oil possibilities of western Canada, the Geological Survey has been doing considerable field work in mapping the geological formations and making a study of the structural features of the sedimentary rocks. The results of field work carried on by A. E. Cameron around the west end of Great Slave lake, by E. J. Whittaker along the tributaries of the Mackenzie below Great Slave lake, by G. S. Hume on the South Nahanni and Root rivers, and by M. Y. Williams on the east side of the Mackenzie between Simpson and Wrigley were published during the year. The results of the studies of certain structural relations in the Mackenzie basin were presented by D. B. Dowling. Further studies of the sediments of the Mackenzie River basin were made by Hume, Whittaker and Williams during the summer of 1922. Drilling operations in the prairie provinces have been closely followed by D. B. Dowling and by the Borings Division of the Geological Survey, in charge of E. D. Ingall, with a view to obtaining as much information as possible about the bedrock geology from samples furnished by well drillers. The importance of this method of working should not be minimized, for it is only through studies of this character that any knowledge of



the bedrock geology of a large part of the drift-covered prairie provinces can be obtained.

### Coal

Contributions to the geology of the coal fields of Canada were made by J. D. MacKenzie, W. L. Uglow, J. R. Marshall and John A. Allan. Mr. MacKenzie, in whose recent untimely death there passed one of the rare spirits in whom superior scientific capacity is combined with a charming personality, made a study of the coal measures of Cumberland and vicinity, Vancouver Island. The sediments in which the coal seams are found have been designated the Comox formation. They are of Cretaceous age. "During the stage of the accumulation of the Comox formation there were recurrent episodes when coal seams formed. In the Tsable River area five of these episodes may be clearly recognized by five usually quite distinct seams which can be correlated with some degree of assurance. In the vicinity of Cumberland the coal accumulation is not so clearly recognizable as belonging to distinct intervals, but even here there is evidence that the thicker coal seams at any rate were accumulated at four or five separate horizons. It is also generally, though not always, true that the thicker seams were formed near the base of the measures and that the seams formed later are thin and unworkable... The thickness of coal in any given seam may vary from a fraction of an inch to many feet, 25 feet of coal being the thickest obtained in any single seam. This, however, included a band of shale four inches thick, and the coal was soft and shaly. A solid bench of bright hard clean coal exceeding 30 inches in thickness is an unusual occurrence, though benches up to 35 inches are known. The upper of the two seams now being mined at Cumberland averages 3 feet 8 inches of coal; the lower one, about 100 feet below and near the base of the measures, averages 4 feet 2 inches."

W. L. Uglow in his description of the geology of the North Thompson River valley presents information regarding the coal fields near Chu Chua. Exact measurements are given of the seams being worked in this field. Analyses show that the coal is of low moisture content but rather high in ash. It is classified as low grade, low rank bituminous or low grade, high rank sub-bituminous coal. "The fuel ratio is that of a low rank bituminous coal; the moisture content suggests a high rank bituminous; the large amount of ash makes it a low grade coal; and the lack of prismatic structure and the tendency to split into sheets parallel to the bedding indicate a sub-bituminous coal."

"It seems probable that the original lignitic coal seams of this district were raised to sub-bituminous rank by thermochemical means; the heat having been supplied by Miocene lavas which it is believed formerly covered the coal measures. These lavas have since been completely removed by erosion."

The coal fields of the Kananaskis Lakes-Palliser River area are described by J. R. Marshall. The coal is of Kootenay age and is of the high carbon bituminous variety. On one property coal seams have been uncovered on almost all the west tributaries of Sheep creek in the upper six miles of its course. A tunnel driven 2,250 feet across the measures cuts 12 or 14 seams of coal ranging in width from a few inches to 39 feet. There are at least seven workable seams.

A report by John A. Allan on the Drumheller coal field, Alberta, states that four seams are being mined. These range respectively in thickness from 6 to 7 feet, from 1.8 to 4 feet, from 3.5 to 5.5 feet, and from 1 to 6.7

feet. The fuel ratios of the coals from these seams, obtained by dividing the percentage of fixed carbon, average respectively 1.36, 1.43, 1.44 and 1.44. The report is remarkable for the general excellence of the illustrations.

A study of the geology and structural features of the Pietou coal field was started by W. A. Bell of the Geological Survey in 1922. It is hoped that the field work, combined with the vast amount of information accumulated by the companies operating in this field, will lead to a clear understanding of the geological structure and be of assistance to the operators in future development work.

### Iron Ore

Field investigations in British Columbia for the purpose of obtaining much more detailed information than at present exists regarding the iron ore deposits of the province were started by G. A. Young during the summer of 1922. No report has yet been made. A report by G. A. Young on "The Iron-Bearing Rocks of Belcher Islands, Hudson Bay," appeared during the year. On these islands iron formation is known to occur in five bands. The total estimated land area occupied by the iron formation and by the volcanics overlying is 198 square miles. The total outcropping area of the iron formation is not greater than 15 square miles. The length of the outcrop exclusive of the problematical areas in the south part of Flaherty island and on the island to the west is estimated to be 119 miles, of which it is estimated only 10 miles all told are sufficiently well exposed to permit of unreservedly stating that iron ore beds are present or absent. No iron ore deposits of commercial value under existing conditions were seen after traversing in all 40 miles of the various bands. Highly ferruginous zones, however, were found, and where the formation was fully exposed two or more such zones were always in evidence. In thickness the individual zones vary from 10 feet to 50 feet. Analyses of samples representing thicknesses up to 24 feet and the examination of the material itself indicate that the zones are composed almost wholly of silica and iron oxides. Four representative samples gave on analysis the following results:

|                         |       |       |       |       |
|-------------------------|-------|-------|-------|-------|
| Silica . . . . .        | 32.52 | 46.48 | 42.12 | 38.60 |
| Metallic iron . . . . . | 44.96 | 35.42 | 37.80 | 39.10 |

### Lead-Zinc

F. J. Alcock describes in detail the geology of the lead-zinc deposits of Lemieux township, Quebec. The deposits are in Devonian shales and limestones intruded by porphyry and syenite. The sediments are folded, faulted, jointed and brecciated. The deposits occur in the form of veins and are believed to be genetically related to the deep-seated intrusive rocks of the area. Siliceous sulphide-bearing solutions from the magma in the later stages of its crystallization probably travelled along lines of fracture for considerable distances from their source and deposited their silica and sulphide content along fracture planes and in brecciated zones.

It is reported that a new discovery of a rich vein of gold, averaging from two to ten feet wide, has been made at Bontddu, near Barmouth, North Wales, in three lines of reef coming from the Clogau gold mines. Near this discovery recent floods have disclosed a reef of gold-bearing quartz over thirty feet wide.



## ALASKA MINERALS IN 1922

The mineral production of Alaska for 1922, as reported by the United States Geological Survey, is \$18,250,000. As a large part of this output was from districts contiguous to Canadian territory in the Yukon and British Columbia, where similar mineral deposits are under operation or are being developed, it has a special interest for Canadians.

Gold was produced to the value of \$7,730,000. Of this \$4,100,000 was from placers. The total output of Alaska to date is \$230,000,000, which is twenty millions more than the total output on the Canadian side. As in the Yukon, dredging and hydraulic ground sufficient for many years of operation has been determined.

The Treadwell mine continues to be the principal gold producer from lodes, though its operations are now restricted on account of the flooding of some of its mines. The Alaska Juncau mine, which treats at a profit ore than contains less than a dollar a ton as it comes up from the mine, has been saved from financial disaster only by some clever and straightforward management. With the aid of a number of smaller mines, the production of lode gold during 1922 was brought up to \$3,600,000.

In the Salmon River area, adjacent to the Portland Canal gold-silver area of British Columbia, there are as yet no producers; but the success of the Premier mine has stimulated a good deal of active development, and the outlook is hopeful.

Copper is produced mainly at the well-known Kennecott mines, opened in 1911. The production for 1922 was 68,000,000 pounds, which raises the total that Alaska has now produced to 740,000,000 pounds.

The Transvaal gold output for November 1922 amounted to 764,476 fine ounces, as compared with 770,159 fine ounces for October 1922 and 704,236 fine ounces for November 1921.

The Bureau of Standards in Washington has proved to be a valuable training-ground for specialists in the various industries. During the twenty-one years of its existence it has trained 574 technical graduates for an average period of 2 1-2 years before their departure. The positions to which these men have gone are, on the average, most desirable and most responsible, as well as well-paid.

During 1922 the United States has produced 400,000,000 tons of bituminous coal, which is about equal to the 1921 production, but from 100 to 150 millions tons below the output of the preceding four years. The anthracite production has been slightly over 50,000,000 tons, which is about 40 million tons below the normal output.

The new feldspar mill at Keene, New Hampshire, which embodies features that are new in the grinding of feldspar, is giving excellent service. The general plan of this mill is that recommended recently by Mr. R. B. Ladoo of the Bureau of Mines, Washington, to supersede the archaic methods now in vogue.

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Sullivan Machinery.

**Air Hoists:**  
Canadian Ingersoll-Rand Co. Ltd.  
Denver Rock Drill Mfg. Co.  
Herbert, Alfred, Limited.  
Holman Bros., Ltd.

**Air Receivers:**  
Canadian Ingersoll-Rand Co., Ltd.

**Alloy & Carbon Tool Steel:**  
Peacock Bros., Ltd.

**Amalgamators:**  
Mine & Smelter Supply Co.

**Asbestos:**  
Everitt & Co.

**Ash Handling Machinery:**  
Canadian Link-Belt Co., Ltd.  
Canadian Mead-Morrison Co.

**Assayers and Chemists:**  
Ledoux & Co.

**Assayer's and Chemists' Supplies:**  
Thos. Hayes & Son  
Lyman, Limited.  
Mine & Smelter Supply Co.

**Balls:**

Herbert, Alfred, Limited  
Holman Bros., Ltd.  
Hull Iron & Steel Foundries, Ltd.  
Peacock Brothers, Limited.  
The William Kennedy & Sons, Ltd.

**Ball Mills:**

Herbert, Alfred, Limited.  
Holman Bros., Ltd.  
Hull Iron & Steel Foundries, Ltd.  
Mine & Smelter Supply.

**Ball Mill Feeders:**

Herbert, Alfred, Limited.  
Holman Bros., Ltd.  
Hull Iron & Smelter Supply.  
Mine & Smelter Supply.

**Ball Mill Linings:**

Canadian Steel Foundries, Ltd.  
The William Kennedy & Sons, Ltd.  
Peacock Bros., Ltd.  
Hull Iron & Steel Foundries, Ltd.  
Mine & Smelter Supply.

**Balances — Assay & Analytical:**

Mine & Smelter Supply.

**Belting — Leather, Rubber & Cotton:**

Canadian Link-Belt Co., Ltd.  
Jones & Glassco (Regd.).

**Belting:**

Gutta Percha & Rubber, Ltd.

**Belting — Silent Chain:**

Canadian Link-Belt Co., Ltd.  
Hans Renold of Canada, Ltd.  
Jones & Glassco (Regd.).

**Belting (Conveyor):**

Gutta Percha & Rubber, Ltd.  
Dunlop Tire & Rubber Co., Ltd.

**Bins & Hoppers:**

Can. Chicago Bridge & Iron Co., Ltd.  
Horton Steel Works, Ltd.

**Binestone:**  
The William Kennedy & Sons, Ltd.

**Boilers:**  
The Consol'd Mining & Smelting Co.

**Boxes, Cable Junction:**  
The William Kennedy & Sons, Ltd.

**Standard Underground Cable Co. of Canada, Ltd.**

**Buggies, Mine Car (Steel):**  
Northern Electric Co., Ltd.

**Hendrick Manufacturing Co.**  
Herbert, Alfred, Limited.  
Holman Bros., Ltd.

**Brazilian Ballas:**  
Diamond Drill Carbon Co.

**Brick:**

Wettlauffer Bros.

**Bronze, Manganese, Perforated & Plain:**  
Hendrick Manufacturing Co.

**Buckets:**

Canadian Ingersoll-Rand Co., Ltd.

Canadian Link-Belt Co. Ltd.

Hadfield, Limited.

Hendrick Manufacturing Co.

Herbert, Alfred, Limited.

Holman Bros., Ltd.

The William Kennedy & Sons, Ltd.

Peacock Bros., Ltd.

**Bucket Lips:**

Canadian Steel Foundries, Ltd.

The William Kennedy & Sons, Ltd.

**Cable — Aerial and Underground:**

Canada Wire & Cable Co.

Standard Underground Cable Co. of Canada Ltd.

Peacock Brothers, Limited.



**Dredging Bopes:**

Allan Whyte & Co.  
Greening, B., Wire Co., Ltd.

**Drills, Air and Hammer:**

Canadian Ingersoll-Rand Co., Ltd.  
Canadian Rock Drill Co.  
Denver Rock Drill Mfg. Co., Ltd.  
Herbert, Alfred, Limited  
Holman Bros. Ltd.  
Sullivan Machinery Co.  
The Mine & Smelter Supply Co.

**Drills—Core:**

Canadian Ingersoll-Rand Co., Ltd.  
Herbert, Alfred, Limited  
Holman Bros., Ltd.  
Sullivan Machinery Co.

**Drill Steel Furnaces:**

Canadian Ingersoll-Rand Co., Ltd.  
Denver Rock Drill Mfg. Co.  
Herbert, Alfred Limited  
Holman Bros., Ltd.  
Sullivan Machinery Co.

**Drills—Diamond:**

Sullivan Machinery Co.

**Drill Steel—Mining:**

Canadian Ingersoll-Rand Co., Ltd.  
Hadfields, Limited  
Mussens, Limited

**Drill Steel Sharpeners:**

Canadian Ingersoll-Rand Co., Ltd.

**Electric Condensers:**

Griswold & Co.  
Canadian Rock Drill Co.  
Denver Rock Drill Mfg. Co., Ltd.  
Herbert, Alfred, Limited  
Holman Bros., Ltd.  
Northern Canada Supply Co.

**Drills—Electric:**

Herbert, Alfred, Limited  
Holman Bros. Ltd.  
Sullivan Machinery Co.  
Northern Electric Co., Ltd.

**Drills—High Speed and Carbon:**

Hadfields, Limited  
Herbert, Alfred, Limited  
Holman Bros. Ltd.

**Ejectors:**

Canadian Ingersoll-Rand Co., Ltd.

**Electric Hoists:**

Canadian Mead-Morrison Co.

**Elevators:**

Canadian Link-Belt Co., Ltd.  
Sullivan Machinery Co.  
Northern Canada Supply Co.  
Hadfields, Limited.  
Jones & Glassco (Regd.).

**Engineering Instruments:**

Laurie & Lamb.  
C. L. Berger & Sons.

**Oil Engines:**

Canadian Ingersoll-Rand Co., Ltd.

**Engines:**

Canadian Sirrocco Co., Ltd.

**Engines—Gas and Gasoline:**

Sullivan Machinery Co.  
Gould, Shapely & Muir Co., Ltd.  
Laurie & Lamb.  
The Mine & Smelter Supply Co.

**Engines—Haulage:**

Canadian Ingersoll-Rand Co., Ltd.

**Engines—Steam:**

Canadian Ingersoll-Rand Co., Ltd.  
Laurie & Lamb.

**Engineers:**

Coyne, Alfred F. A.  
Dresser, John A.  
Door Co.  
Ferrier, W. F.  
Hore, R. E.  
Heves & Sons, Thos.  
Hersey Co., Ltd. Milton  
McEvoy, James C.  
Rogers, George R.  
Ross, Jas. G.  
Stewart, Robert H.  
Tyrrell, J. B.  
Whitman, Alfred B.  
Wilson, Ridgway R.

**Exhauster:**

Canadian Sirrocco Co., Ltd.

**Ferro-Alloys (all Classes):**

Canadian Steel Foundries, Ltd.  
Canadian Steel Foundries, Ltd.  
Everitt & Co.

**Fire Fighting Supplies:**

Gutta Percha & Rubber, Ltd.

**Flood Lamps:**

Northern Electric Co., Ltd.

**Flotation Oil:**

Hercules Powder Co.

**Flourspar:**

Consolidated Mining & Smelting Co.  
Everitt & Co.

**Forging:**

Canada Foundry & Forging, Ltd.

**Herbert, Alfred, Limited**

Holman Bros., Ltd.  
Hull Iron & Steel Foundries, Ltd.  
Smart-Turner Machine Co.

**Coal Screening Plants:**

Canadian Link-Belt Co., Ltd.  
Canadian Mead-Morrison Co.

**Cobalt Oxide:**

Everitt & Co.

**Compressors—Air:**

Belliss & Morcom, Ltd.  
Canadian Ingersoll-Rand Co., Ltd.  
Denver Rock Drill Mfg. Co.  
Herbert, Alfred, Limited  
Holman Bros., Ltd.  
Laurie & Lamb.  
Smart-Turner Machine Co.  
Peacock, Brothers, Limited.

**Concrete Mixers:**

Gould, Shapely & Muir Co., Ltd.

**Condensers:**

Canadian Ingersoll-Rand Co., Ltd.  
Smart-Turner Machine Co.  
Belliss & Morcom, Ltd.  
Laurie & Lamb.  
Peacock Brothers, Ltd.

**Concentrating Tables:**

Herbert, Alfred, Limited  
Holman Bros., Ltd.  
The Mine & Smelter Supply Co.

**Condensers—Electrical Static & Power:**

Griswold & Co.

**Consulters and Engineers:**

Milton Hersey Co., Ltd.

**Conveyors:**

Canadian Link-Belt Co., Ltd.  
Canadian Mead-Morrison Co.  
Jones & Glassco (Regd.).

**Conveyor Belts:**

Gutta Percha and Rubber, Ltd.

**Conveyor Flights:**

Canadian Link-Belt Co., Ltd.

**Conveyor—Trough—Belt:**

Canadian Link-Belt Co., Ltd.  
Hendrick Mfg. Co.  
Jones & Glassco, Regd.

**Copper:**

Consolidated Mining & Smelting Co.

**Couplings:**

Hans Renold of Can., Ltd.

**Cranes**

Canadian Link-Belt Co., Ltd.  
Canadian Mead-Morrison Co.  
Peacock Brothers, Limited  
Smart-Turner Machine Co.

**Crane Ropes:**

Allan Whyte & Co.  
Canada Wire & Cable Co.  
Greening, B., Wire Co., Ltd.

**Crucibles:**

The Mine & Smelter Supply Co.

**Crusher Balls:**

Canada Foundries & Forgings, Ltd.  
Herbert, Alfred, Limited  
Holman Bros., Ltd.  
Hull Iron & Steel Foundries, Ltd.  
Peacock Brothers, Limited.  
The William Kennedy & Sons, Ltd.

**Crushers:**

Canadian Ingersoll-Rand Co., Ltd.  
Herbert, Alfred, Limited  
Holman Bros., Ltd.  
Hull Iron & Steel Foundries, Ltd.  
Wettlaufer Bros.  
Lymans, Limited  
The Mine & Smelter Supply Co.  
Hadfields, Limited

**Cut Gears:**

Hans Renold of Can., Ltd.  
Jones & Glassco, Regd.  
The William Kennedy & Sons, Ltd.

**Cyanide:****Cyanide Plant Equipment:**

The Door Co.  
The Mine & Smelter Supply Co.

**Derricks:**

Smart-Turner Machine Co.

**Diamond Drill Contractors:**

Smith & Travers  
Sullivan Machinery Co.

**Digesters:**

Can Chicago Bridge & Iron Co., Ltd.  
Horton Steel Works, Ltd.

**Diesel Engines:**

Belliss & Morcom, Ltd.  
Laurie & Lamb.

**Dies:**

Canada Foundries & Forgings, Ltd.  
Herbert, Alfred, Limited  
Hull Iron & Steel Foundries, Ltd.  
Holman Bros., Ltd.

**Drain Tile:**

Wettlaufer Brothers.

**Dredges:**

Canadian Mead-Morrison Co.

**Dredger Pins:**

Hull Iron & Steel Foundries, Ltd.

**Dredging Machinery:**

Hadfields, Limited  
Hull Iron & Steel Foundries Ltd.

**Cages:**

Canadian Ingersoll-Rand Co. Ltd.  
The Mine & Smelter Supply Co.  
Herbert, Alfred, Limited.  
Holman, Ltd.  
The William Kennedy & Sons, Ltd.

**Cables—Wire:**

Standard Underground Cable Co. Ltd.  
Canada Wire & Cable Co.

**Cable Railway Systems:**

Canada Wire & Cable Co.

**Cam Shafts:**

Canada Foundries & Forgings, Ltd.  
Herbert, Alfred, Limited  
Holman Bros., Ltd.  
Hull Iron & Steel Foundries, Ltd.  
Peacock Brothers, Ltd.  
The William Kennedy & Sons, Ltd.

**Car Dumps:**

Canadian Mead-Morrison Co.  
Herbert, Alfred, Limited.  
Holman Bros., Ltd.  
Sullivan Machinery Co.

**Cars:**

Canadian Mead-Morrison Co.  
Herbert, Alfred, Limited.  
Holman Bros., Ltd.  
John J. Gartshore.  
Peacock Brothers, Limited.  
The William Kennedy & Sons, Ltd.

**Car Pullers:**

Canadian Mead-Morrison Co.

**Car Wheels and Axles:**

Herbert, Alfred, Limited.  
Holman Bros., Ltd.  
Hull Iron & Steel Foundries, Ltd.  
John J. Gartshore.  
Peacock Brothers, Limited  
The William Kennedy & Sons, Ltd.

**Carriers (Gravity):**

Jones & Glassco, Reg.

**Cast Steel Gears:**

Canada Foundries, Ltd.  
The William Kennedy & Sons, Ltd.

**Castings (Iron and Steel):**

Herbert, Alfred, Limited.  
Holman Bros., Ltd.  
Hull Iron & Steel Foundries, Ltd.  
Peacock Brothers, Limited.  
The William Kennedy & Sons, Ltd.

**Cement Machinery:**

Hadfields, Limited.  
Hull Iron & Steel Foundries, Ltd.  
The William Kennedy & Sons, Ltd.

**Chains:**

Jones & Glassco, Reg.  
Canadian Link-Belt Co., Ltd.  
Greening, B., Wire Co., Ltd.

**Chain Drives:**

Jones & Glassco (Regd.)

**Chain Drives—Silent and Steel Roller:**

Canadian Link-Belt Co. Ltd.  
Hans Renold of Can., Ltd.  
Jones & Glassco (Regd.).

**Chemist:**

Thos. Heyes & Sons.  
Milton Hersey Co.

**Chrome Ore:**

Everitt & Co.

**Crusher Jaws:**

Canadian Steel Foundries, Ltd.  
The William Kennedy & Sons, Ltd.

**Crushing Rolls:**

Canadian Steel Foundries, Ltd.  
The William Kennedy & Sons, Ltd.

**Classifiers:**

The Dorr Company

**Clutches:**

Canadian Link-Belt Co., Ltd.  
Hans Renold of Can., Ltd.

**Coal:**

Dominion Coal Co.  
Nova Scotia Steel & Coal Co.

**Coal Cutters:**

Sullivan Machinery Co.  
Canadian Ingersoll-Rand Co., Ltd.  
Herbert, Alfred, Limited  
Holman Bros., Ltd.  
Peacock Brothers, Limited

**Coal Crushers:**

Canadian Link-Belt Co., Ltd.  
Peacock Brothers, Limited.

**Coal Mining Machinery:**

Canadian Ingersoll-Rand Co., Ltd.  
Canadian Rock Drill Co.  
Denver Rock Drill Lfg. Co., Ltd.  
Sullivan Machinery Co.  
Hadfields, Limited.  
Hendrick Mfg. Co.  
Herbert, Alfred, Limited  
Holman Bros., Ltd.



- Pipes:**  
Consolidated Mining & Smelting Co.
- Coal and Coke Handling Machinery:**  
Canadian Link-Belt Co., Ltd.
- Coal Picking Machines:**  
Canadian Ingersoll-Rand Co., Ltd.  
Herbert, Alfred, Limited.  
Holman Bros., Ltd.
- Crushers:**  
Consolidated Mining & Smelting Co.
- Levels:**  
C. L. Berger & Sons.
- Light and Heavy Steel Plate Construction:**  
Hendrick Mfg. Co.  
The William Kennedy & Sons, Ltd.
- Locomotives (Steam, Compressed Air and Storage):**  
Canadian Ingersoll-Rand Co., Ltd.  
Laurie & Lamb.
- Link Belt:**  
Canadian Link-Belt Co., Ltd.  
Northern Canada Supply Co.  
Jones & Glasco, Regd.
- Machine Guards:**  
Greening, B. Wire Co., Ltd.
- Magnesium Metal:**  
Everitt & Co.  
Hull Iron & Steel Foundries, Ltd.
- Manganese Steel:**  
Hadfields, Ltd.  
Hull Iron & Steel Foundries, Ltd.
- Manganese-Steel Trackworks:**  
Canadian Steel Foundries, Ltd.
- Metal Merchants:**  
Consolidated Mining & Smelting Co.  
C. L. Constant Co.  
Everitt & Co.
- Metallurgical Engineers:**  
The Dorr Co.
- Metallurgical Machinery:**  
Dwight & Lloyd Sintering Co.  
The Dorr Co.  
The Mine & Smelter Supply Co.
- Metal Work, Heavy Plates:**  
Can. Chicago Bridge & Iron Co., Ltd.  
Horton Steel Works, Ltd.  
The William Kennedy & Sons, Ltd.
- Mica:**  
Everitt & Co.
- Mine Cars:**  
Canadian Steel Foundries, Ltd.  
The William Kennedy & Sons, Ltd.
- Mining Engineers:**  
Hersey, M. & Co., Ltd.
- Mining Drill Steel:**  
Hadfields, Limited.
- Mining Requisites:**  
Dominion Wire Rope Co., Ltd.  
Hadfields, Limited.  
Hull Iron & Steel Foundries, Ltd.
- Mining Ropes:**  
Dominion Wire Rope Co., Ltd.  
Peacock Brothers, Ltd.
- Mine Surveying Instruments:**  
C. L. Berger & Sons.
- Molybdenite:**  
Everitt & Co.
- Motors:**  
Peacock Brothers, Ltd.
- Nickel:**  
The Mond Nickel Co., Ltd.
- Ore Handling Equipment:**  
Canadian Link-Belt Co., Ltd.  
Canadian Mead-Morrison Co.  
Herbert, Alfred, Limited.
- Ore Sacks:**  
Northern Canada Supply Co.
- Ore Testing Works:**  
Ledoux & Co.  
Can. Laboratories.  
Hoyt Metal Co.
- Ores & Metals—Buyers & Sellers of:**  
Geo. G. Blackwell.  
Consolidated Mining & Smelting Co.  
Everitt & Co.
- Oils:**  
Hercules Powder Co.
- Pavers:**  
Wettlauffers Brothers.  
Gutta Percha & Rubber, Ltd.  
Laurie & Lamb.
- Perforated Metals:**  
Hendrick Mfg. Co.  
Canada Wire & Iron Goods Co.  
Greening, B. Wire Co.
- Pillow Blocks:**  
Canadian Link-Belt Co., Ltd.  
The William Kennedy & Sons, Ltd.
- Pipe — Wood Staver:**  
Pacific Coast Pipe Co.  
Mine & Smelter Supply Co.  
Canadian Ingersoll-Rand Co., Ltd.
- Piston Rock Drills:**  
Mine & Smelter Supply Co.  
Herbert, Alfred, Limited.  
Holman Bros., Ltd.
- Plate Works:**  
Can. Chl. Bridge & Iron Co., Ltd.  
Hendrick Mfg. Co.  
The William Kennedy & Sons, Ltd.  
Horton Steel Works, Ltd.
- Platinum Refiners:**  
Goldsmith Brothers.
- Pneumatic Tools:**  
Canadian Ingersoll-Rand Co., Ltd.  
Herbert, Alfred, Limited.  
Holman Bros., Ltd.
- Portable Column Hoists:**  
Canadian Ingersoll-Rand Co., Ltd.  
Denver Rock Drill Mfg. Co.  
Herbert, Alfred, Limited.  
Holman Bros., Ltd.  
Sullivan Machinery Co.
- Power Factor Correcting Devices:**  
Griswold & Co.
- Power Condensers:**  
Griswold & Co.
- Prospecting Mills & Machinery:**  
Mine & Smelter Supply Co.
- Pumps—Pneumatic:**  
Canadian Ingersoll-Rand Co., Ltd.  
Smart-Turner Machine Co.  
Sullivan Machinery Co.
- Pumps—Steam:**  
Canadian Ingersoll-Rand Co., Ltd.  
Northern Canada Supply Co.  
Peacock Brothers, Ltd.  
Smart-Turner Machine Co.
- Pumps—Turbines:**  
Smart-Turner Machine Co.  
Canadian Ingersoll-Rand Co., Ltd.  
Laurie & Lamb.  
Peacock Brothers, Ltd.
- Pumps—Vacuum:**  
Canadian Ingersoll-Rand Co., Ltd.  
Smart-Turner Machine Co.  
Peacock Brothers, Ltd.
- Pumps—Valves:**  
Peacock Brothers, Ltd.
- Pulleys Shafting and Hangers:**  
The William Kennedy & Sons, Ltd.
- Pulverizers—Laboratory:**  
Herbert, Alfred, Limited.  
Holman Bros., Ltd.  
Mine & Smelter Supply Co.
- Pumps—Boiler Feed:**  
Canadian Ingersoll-Rand Co., Ltd.  
Smart-Turner Machine Co.  
Peacock Brothers, Ltd.
- Pumps—Centrifugal:**  
Canadian Ingersoll-Rand Co., Ltd.  
Laurie & Lamb.  
Peacock Brothers, Limited.  
Smart-Turner Machine Co.
- Pumps—Diaphragm:**  
The Dorr Company.  
The William Kennedy & Sons, Ltd.
- Pumps—Electric:**  
Canadian Ingersoll-Rand Co., Ltd.  
Laurie & Lamb.  
Peacock Brothers, Ltd.  
Smart-Turner Machine Co.
- Pumps—Sand & Slime:**  
Canadian Ingersoll-Rand Co., Ltd.  
Laurie & Lamb.  
Mine & Smelter Supply Co.  
Peacock Brothers, Ltd.  
Smart-Turner Machine Co.  
Sylvester Mfg. Co., Ltd.
- Push Cars:**  
Sylvester Mfg. Co.
- Poultry Netting:**  
Greening, B. Wire Co., Ltd.
- Quarrying Machinery:**  
Canadian Ingersoll-Rand Co., Ltd.  
Canadian Rock Drill Co.  
Denver Rock Drill Mfg. Co., Ltd.  
Hadfields, Limited.  
Herbert, Alfred, Limited.  
Holman Bros., Ltd.  
Sullivan Machinery Co.



- Alis:**  
Hadfields, Limited.  
John J. Gartshore.
- Finers:**  
Goldsmith Brothers.
- Rollers:**  
Hendrick Mfg. Co.
- Roll Mills:**  
Mine & Smelter Supply Co.
- Roll Shells:**  
The William Kennedy & Sons, Ltd.  
Canadian Steel Foundries, Ltd.
- Roller Chain:**  
Hans Renold of Canada, Ltd.  
Canadian Link-Belt Co., Ltd.  
Jones & Glassco, Regd.
- Rope—Manilla & Jute:**  
Jones & Glassco, Regd.  
Allan, Whyte & Co.
- Rope—Wire:**  
Anglo Canadian Wire Rope Co.  
Allan, Whyte & Co., Ltd.  
Canada Wire & Cable Co.  
Canada Wire & Iron Goods Co.  
Dominion Wire Rope Co., Ltd.  
Greening, B. Wire Co.
- Rolls—Crushing:**  
Canadian Ingersoll-Rand Co., Ltd.  
Everitt & Co.  
Hadfields, Limited.  
Hull Iron & Steel Foundries, Ltd.  
Herbert, Alfred, Ltd.  
Holman Bros., Ltd.  
Wettlaufer Bros.
- Rollers:**  
Canada Metal Co.  
Ledoux & Co.  
Milton Hersey Co.  
Thos. Heyes & Son.  
Mine & Smelter Supply Co.
- Rollers:**  
Canadian Ingersoll-Rand Co., Ltd.  
Greening, B. Wire Co.  
Hendrick Mfg. Co.  
Canada Wire & Iron Goods Co.
- Rollers—Cross Patent Flanged Lip:**  
Hendrick Mfg. Co.
- Rollers—Perforated Metal:**  
Hendrick Mfg. Co.
- Rollers—Shaking:**  
Canadian Link-Belt Co., Ltd.  
Hendrick Mfg. Co.
- Rollers—Revolving:**  
Canadian Link-Belt Co., Ltd.  
Hendrick Mfg. Co.  
The William Kennedy & Sons, Ltd.
- Rollers:**  
Smart-Turner Machine Co.  
Mine & Smelter Supply Co.
- Roller Pipes:**  
Wettlaufer Bros.
- Roller Contractors:**  
Hendrick Mfg. Co.
- Roller Metal Work:**  
Hendrick Mfg. Co.
- Rollers—Genuine Manganese Bronze:**  
Hendrick Mfg. Co.
- Rollers and Dies:**  
Hull Iron & Steel Foundries, Ltd.  
Peacock Brothers, Ltd.  
The William Kennedy & Sons, Ltd.
- Roller Loaders:**  
Canadian Mead-Morrison Co.
- Roller Chain:**  
Canadian Link-Belt Co., Ltd.  
Hans Renold of Canada, Ltd.  
Jones & Glassco, Regd.
- Roller and Steel Roller:**  
Canadian Link-Belt Co., Ltd.  
Jones & Glassco, Regd.
- Roller Refiners:**  
Goldsmith Brothers.
- Rollers:**  
Goldsmith Bros.
- Rollers:**  
Canada Foundries & Forgings.
- Rolling:**  
Dwight & Lloyd Sintering Co., Inc.
- Roller Stacks:**  
Can. Chicago Bridge & Iron Co., Ltd.  
Horton Steel Works, Ltd.  
Hendrick Mfg. Co.  
The William Kennedy & Sons, Ltd.
- Roller Machinery:**  
The William Kennedy & Sons, Ltd.
- Roller:**  
Consolidated Mining & Smelting Co.
- Roller Sprockets:**  
Hans Renold of Canada, Ltd.
- Canadian Link-Belt Co., Ltd.**  
Jones & Glassco, Regd.  
The William Kennedy & Sons, Ltd.
- Static Condensers:**  
Griswold & Co.
- Spring Coil & Clips Electric:**  
Canadian Steel Foundries, Ltd.
- Steel Barrels:**  
Smart-Turner Machine Co.
- Stamp Batteries:**  
Herbert, Alfred, Limited.  
Holman Bros., Ltd.
- Stamp Forgings:**  
Canada Foundries & Forgings, Ltd.  
Hull Iron & Steel Foundries.
- Steel Castings:**  
Canadian Steel Foundries, Ltd.  
Canadian Brakeshoe Co., Ltd.  
Hull Iron & Steel Foundries, Ltd.  
Hadfields, Ltd.  
The William Kennedy & Sons, Ltd.
- Steel Drills:**  
Canadian Rock Drill Co.  
Denver Rock Drill Mfg. Co., Ltd.  
Sullivan Machinery Co.  
Peacock Brothers, Ltd.  
Canadian Ingersoll-Rand Co., Ltd.
- Steam Hoisting Engines:**  
Canadian Mead-Morrison Co.
- Steam Engines:**  
Belliss & Morcom, Ltd.  
Laurie & Lamb.
- Steam Traps:**  
Canadian Sirocco Co., Ltd.  
Laurie & Lamb.
- Steel Drums:**  
Smart-Turner Machine Co.
- Steel Tool:**  
N. S. Steel & Coal Co.  
Hadfields, Limited.
- Structural Steel Work—Light:**  
Hendrick Mfg. Co.  
The William Kennedy & Sons, Ltd.
- Stone Breakers:**  
Holman Bros., Ltd.  
Canadian Ingersoll-Rand Co., Ltd.  
Denver Rock Drill Mfg. Co.  
Herbert, Alfred, Limited.
- Stone Quarrying Machinery:**  
Canadian Ingersoll-Rand Co., Ltd.  
Denver Rock Drill Mfg. Co.  
Sullivan Machinery Co.
- Sulphate of Copper:**  
The Mond Nickel Co., Ltd.
- Surveying Instruments:**  
C. L. Berger.
- Switches:**  
Canadian Steel Foundries, Ltd.
- Switches and Turntables:**  
John J. Gartshore.
- Tables—Concentrating:**  
Mine & Smelter Supply Co.
- Tanks:**  
Can. Chicago Bridge & Iron Co., Ltd.  
Horton Steel Works, Ltd.
- Tanks—Acid:**  
Can. Chicago Bridge & Iron Co., Ltd.  
Horton Steel Works, Ltd.  
Ontario Wind Engine & Pump Co.
- Tanks—Wooden:**  
Gould, Shapley & Muir Co., Ltd.  
Ontario Wind Engine & Pump Co.  
Pacific Coast Pipe Co., Ltd.  
Mine & Smelter Supply Co.
- Tanks, Cyanide, Etc.:**  
Can. Chicago Bridge & Iron Co., Ltd.  
Horton Steel Works, Ltd.  
Hendrick Mfg. Co.  
Ontario Wind Engine & Pump Co.  
Pacific Coast Pipe Co.
- Tanks—Steel:**  
Canadian Ingersoll-Rand Co., Ltd.  
Can. Chicago Bridge & Iron Co., Ltd.  
Horton Steel Works, Ltd.  
Hendrick Mfg. Co.  
The William Kennedy & Sons, Ltd.
- Tanks—Oil Storage:**  
Can. Chicago Bridge & Iron Co., Ltd.  
Horton Steel Works, Ltd.
- Tanks—Water & Steel Towers:**  
Can. Chicago Bridge & Iron Co., Ltd.  
Horton Steel Works, Ltd.  
Ontario Wind Engine & Pump Co., Ltd.
- Tires—Auto, Truck and Bicycle:**  
Canada Foundry & Forgings, Ltd.  
Gutta Percha & Rubber, Ltd.  
Hadfields, Ltd.
- Trailers:**  
Sylvester Mfg. Co., Ltd.
- Tramway Points & Crossings:**  
Hadfields, Limited.
- Transits:**  
C. L. Berger & Sons.
- Transformers:**  
Northern Electric Co., Ltd.
- Transmission Appliances:**  
Jones & Glassco, Regd.
- Transmission Machinery:**  
Canadian Link-Belt Co., Ltd.  
Hans Renold of Canada, Ltd.  
Jones & Glassco, Regd.  
The William Kennedy & Sons, Ltd.
- Troughs (Conveyor):**  
Hendrick Mfg. Co.
- Trucks:**  
Hammant Steel Car & Eng. Works.
- Tubs:**  
Hadfields, Limited.
- Tube Mills:**  
Canada Foundries & Forgings, Ltd.  
Herbert, Alfred, Limited.  
Holman Bros., Ltd.  
The William Kennedy & Sons, Ltd.  
Mine & Smelter Supply.
- Tube Mill Balls:**  
Canada Foundries & Forgings, Ltd.  
Herbert, Alfred, Limited.  
Holman Bros., Ltd.  
Hull Iron & Steel Foundries, Ltd.  
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# CANADA

## DEPARTMENT OF MINES

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### MINES BRANCH

#### Recent Publications

Phosphate in Canada, by H. S. Spence.

The Preparation, Transportation and Combustion of Powdered Coal, by John Blizard.

Road Materials along the St. Lawrence River, from Quebec Boundary to Cardinal, Ont., by R. H. Picher.

Building and Ornamental Stones of Canada (British Columbia.) Vol. V., by W. A. Parks, Ph. D.

Barium and Strontium in Canada, by H. S. Spence.

The Coalfields and Coal Industry of Eastern Canada, by F. W. Gray.

The Value of Peat Fuel for the Generation of Steam, by J. Blizard, B. Sc.

Analyses of Canadian Fuels. Parts I to V, by E. Stansfield M. Sc., and J. H. H. Nicolls, M. Sc.

Graphite by H. S. Spence.

Gas Producer Trials with Alberta Coals, by J. Blizard and E. S. Malloch.

Summary Report of the Mines Branch, 1920.

The Mines Branch maintains the following laboratories in which investigations are made with a view to assisting in the development of the general mining industry of Canada:

**Fuel Testing Laboratory.**—Testing value of Canadian fuels for steam raising and production of power gas; analyses, and other chemical and physical examinations of solid, liquid and gaseous fuels are also made.

**Ore-Dressing Laboratory.**—Testing of Canadian ores and minerals, to ascertain most economical methods of treatment.

**Chemical Laboratory.**—Analysing and assaying of all mineral substances and their manufactured products. Copies of schedules of fees, which are slightly in excess of those charged by private practitioners, may be had on application.

**Ceramic Laboratory.**—Equipment is such that complete physical tests on clays and shales of the Dominion can be made, to determine their value from an economic standpoint.

**Structural Materials Laboratory.**—Experimental work on sands, cements and limes is also undertaken.

Applications for reports and particulars relative to having investigations made in the several laboratories should be addressed to **The Director, Mines Branch, Department of Mines, Ottawa.**

Summary Report. The annual Summary Report of the Geological Survey is now printed in parts. Applicants should, therefore, state what particular geologist report is required, or what subject they are interested in.

Memoir 108. The Mackenzie River Basin, by Charles Camsell and Wyatt Malcolm.

### GEOLOGICAL SURVEY

#### Recent Publications

Memoir 119. The Reed-Wekusko Map-Area, Northern Manitoba, by F. J. Alcock.

Memoir 121. The Malagash Salt Deposit, Cumberland County, N. S., by A. O. Hayes.

Memoir 123. Sixty-mile and Ladue Rivers Area, Yukon, by W. E. Cockfield.

Memoir 125. Sedimentation of the Fraser River data, by W. A. Johnston.

Memoir 127. Beauceville map-area, Quebec, by B. R. McKay.

Memoir 128. Winnipegosis and Upper Whitemouth River areas, Manitoba, Pleistocene and Recent deposits, by W. A. Johnston.

Memoir 130. Geology and mineral deposits of the Bridge River map-area, British Columbia, by W. S. McCann.

Memoir 131. Kenogami, Round and Larder Lake areas, Timiskaming district, Ontario, by H. C. Cooke.

Map 1585. Mackenzie River basin, 1922 edition. Geology.

Map 1751. Wainwright, Alberta. Topography.

Map 1752. Monitor, Alberta and Saskatchewan. Topography.

Map 1754. Upper Elk and Highwood rivers, British Columbia and Alberta. Topography.

Map 1829. Salmon River area, Portland Canal mining division, B. C. Geology.

Map 1831. Vegreville; townships 47 to 55, ranges 11 to 16 west of the 4th meridian, Alberta. Topography.

Map 1835. Beauceville, Beauce county, Quebec. Geology.

Map 1836. Explored routes in a belt traversed by the Canadian National Railways between Longlac and Nipigon, Ontario. Geology.

Map 1860. Keno Hill area, Mayo district, Yukon. Geology.

Map 1882. Bridge River, B. C. Geology.

Map 1901. Upper Kitzault valley, B. C. Geology.

Map 1948. Wanapitei Lake area, Ont. Geology.

Applicants for publications not listed above should mention the precise area concerning which information desired.

The Geological Survey will, under certain limitations, give information and advice upon subjects relating to general and economic geology. Mineral and rock specimens, when accompanied by definite statements of localities, will be examined and their nature reported upon.

Communications should be addressed to **The Director, Geological Survey, Ottawa.**



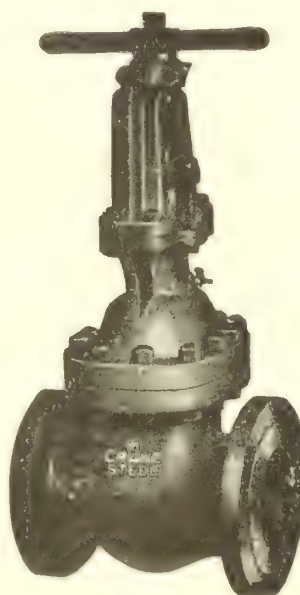
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# Ontario's



# Minerals

PROVINCE OF ONTARIO

DEPARTMENT OF MINES

HON H. MILLS, Minister of Mines

## Mineral Areas.

Ontario, with its 407,262 square miles, contains many millions of acres in which the geological formations are favorable for the occurrence of minerals, 70 per cent of the area being underlain by rocks of pre-Cambrian age. The phenomenally rich silver mines of Cobalt occur in these rocks; so also do the far-famed nickel-copper deposits of Sudbury, the gold of Porcupine and Kirkland Lake, and the iron ore of Magpie and Moose Mountain mines.

## Economic Minerals.

In addition to the above, practically all economic minerals (coal and tin excepted) are found in Ontario:—actinolite, apatite, arsenic, asbestos, cobalt, corundum, feldspar, fluor-spar, graphite, gypsum, iron pyrites, lead, mica, molybdenite, natural gas, palladium, petroleum, platinum, quartz, salt, talc and zinc. This Province has the largest deposits on the continent of talc, feldspar, mica and graphite.

Building materials, such as ornamental marble, limestone, sandstone, granite, trap, sand and gravel, lime, portland cement, brick and tile, meet every demand.

## Mineral Production.

Preliminary returns show the output of the mines and metallurgical works of the Province for the year 1921 to be worth \$48,128,387, of which the metallic production was \$27,574,202.

The following figures show the rapid growth of Ontario's mineral industry by five-year periods since 1891:

| Year.          | Value.      | Year.          | Value.       |
|----------------|-------------|----------------|--------------|
| 1891 . . . . . | \$4,705,672 | 1906 . . . . . | \$22,388,383 |
| 1896 . . . . . | 5,235,003   | 1911 . . . . . | 41,976,797   |
| 1901 . . . . . | 11,831,086  | 1916 . . . . . | 65,303,822   |

## Dividends.

Dividends and bonuses paid to the end of 1921 amounted to \$23,140,734 for gold mining companies, and \$84,388,185 for silver mining companies or a total of \$107,528,919.

## Mining Regulations.

A miner's license costs \$5.00 per annum, and entitles the holder to stake out in any or every mining division three claims of 40 acres each. After performing 200 days' assessment work on a claim, patent may be obtained from the Crown on payment of \$2.50 or \$3.00 per acre, depending on location in unsurveyed or surveyed territory.

## Assay Office.

The Provincial Assay Office at No. 5 Queen's Park, Toronto, is maintained by the Department of Mines for the free identification of minerals, free assays under the provisions of the Mining Act of Ontario, and also for general assay work as per the Schedule of Charges which may be obtained on application.

## Temiskaming Testing Laboratories

The Department maintains, at Cobalt, an ore sampling and testing laboratory which is now prepared to receive parcels of gold ore from 100 pounds upward, and after sampling and assaying the same to pay to the shipper the value thereof, less treatment charges. The purpose is to afford a market for ores extracted by prospectors and others in developing their mining claims, enabling them to obtain funds which they can use for further work and to report on the most satisfactory method of treatment. Fuller information may be obtained on application to the Manager, Temiskaming Testing Laboratories, Cobalt, Ontario.

## Publications.

For list of publications, illustrated reports, geological maps and mining laws, apply to

THOS. W. GIBSON,  
Deputy Minister of Mines,  
TORONTO, CANADA.

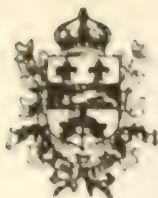


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# PROVINCE OF QUEBEC

## MINES BRANCH

Department of Colonization, Mines and Fisheries

The chief minerals of the Province of Quebec are Asbestos, Chromite, Copper, Iron, Gold, Molybdenite, Phosphate, Mica, Graphite, Ornamental and Building Stone, Clays, etc.

**MINISTER OF COLONIZATION, MINES AND FISHERIES, QUEBEC**

**MINER'S CERTIFICATES.** First of all, obtain a miner's certificate, from the Department in Quebec or from the nearest agent. The price of this certificate is \$10 and is valid until the first of January following. This certificate gives the right to prospect on public lands and on private lands, on which the mineral rights belong to the Crown.

The holder of the certificate may stake mining claims to the extent of 200 acres.

**WORKING CONDITIONS.** During the first six months following the staking of the claim, work on it must be performed to the extent of at least twenty-five days of eight hours.

**SIX MONTHS AFTER STAKING.** At the expiration of six months from the date of the staking, the prospector, to retain his rights, must take out a mining license.

**MINING LICENSE.** The mining license may cover 40 to 200 acres in unsurveyed territory. The price of this license is Fifty Cents an acre per year, and a fee of \$10.00 on issue. It is valid for one year and is renewable on the same terms, on producing an affidavit that during the year work has been performed to the extent of at least twenty-five days' labour on each forty acres.

**MINING CONCESSION.** Notwithstanding the above, a mining concession may be acquired at any time at the rate of \$5 an acre for SUPERIOR METALS, and \$3 an acre for INFERIOR MINERALS.

The attention of prospectors is especially called to the territory in the North-Western part of the Province of Quebec north of the height of land, where important mineralized belts are known to exist.

**PROVINCIAL LABORATORY.** Special arrangements have been made with POLYTECHNIC SCHOOL of LAVAL UNIVERSITY, 228 ST. DENIS STREET, Montreal, for the determination, assays and analysis of minerals at very reduced rates for the benefit of miners and prospectors in the Province of Quebec. The well equipped laboratories of this institution and its trained chemists ensure results of undoubted integrity and reliability.

The bureau of Mines at Quebec will give all the information desired in connection with the mines and mineral resources of the Province, on application addressed to

**HONORABLE J. E. PERRAULT,**

The Mining Law gives absolute security of Title and is very favourable to the Prospector.

# BRITISH COLUMBIA

## The Mineral Province of Western Canada

Has produced Minerals valued as follows: Placer Gold, \$76,177,403; Lode Gold, \$105,557,977; Silver, \$55,259,485; Lead, \$48,330,575; Copper, \$166,393,488; Zinc, \$21,848,531; Coal and Coke, \$225,409,505; Building Stone, Brick Cement, etc., \$34,072,016; Miscellaneous Minerals, \$1,210,639; Making its mineral production to the end of 1920 show an

### Aggregate Value of \$734,259,619

The substantial progress of the Mining Industry of this Province is strikingly exhibited in the following figures, which show the value of production for successive five-year periods: For all years to 1895, inclusive \$94,547,241; for five years, 1896-1900, \$57,605,967; for five years, 1901-1905, \$96,509,968; for five years, 1906-1910, \$125,534,474; for five years, 1911-1915, \$142,072,603; for the year 1916, \$42,290,462; for the year 1917, \$37,010,392; for the year 1918, \$41,782,474; for the year 1919, \$33,290,313; 1920, \$35,543,084; 1921, \$28,066,641.

### Production During last ten years, \$336,562,897

Lode-mining has only been in progress for about twenty-five years, and not 20 per cent. of the Province has been even prospected; 300,000 square miles of unexplored mineral bearing land are open for prospecting.

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Mineral locations are granted to discoverers for nominal fees.

Absolute Titles are obtained by developing such properties, the security of which is guaranteed by Crown Grants.

Full information, together with Mining Reports and Maps, may be obtained gratis by addressing.

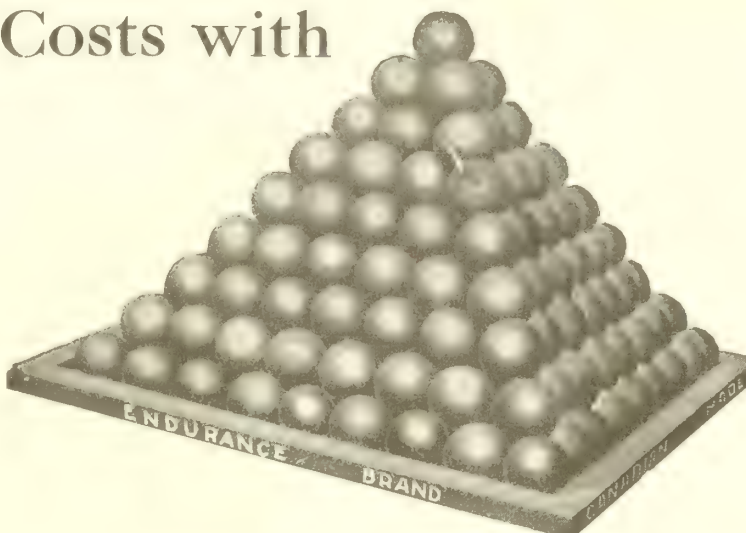
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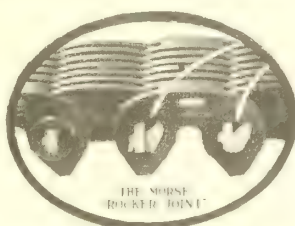
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"When we used leather belts on the hydraulic pumps, if a pump packing suddenly gave way, the water would squirt all over the pump as well as adjoining pumps, causing the leather belts to get wet. This often necessitated a shut-down on 3 to 4 pumps to dry out each belt, thus causing a loss of time by the men, which resulted many times in paying overtime to catch up on the work. Of course, with our Morse Chain Drive we have no such trouble—this positive drive prevents slippage and is not affected by water.

"Leather belts lasted us 2 to 3 years at the most, while our Morse Chain Drives have already lasted 3 to 4 times that long and seem good for many more years. So Morse Drives have cut our expense materially, speeded up production, cut out overtime wages and saved floor space, for they operate on shorter centers."



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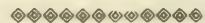
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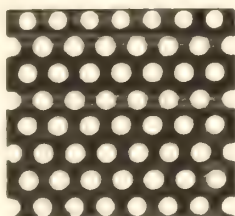
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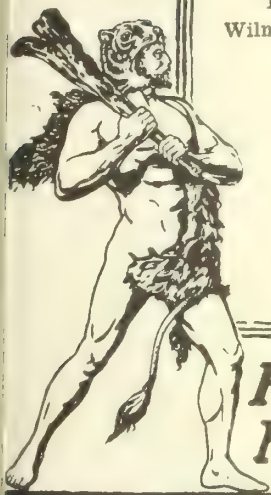
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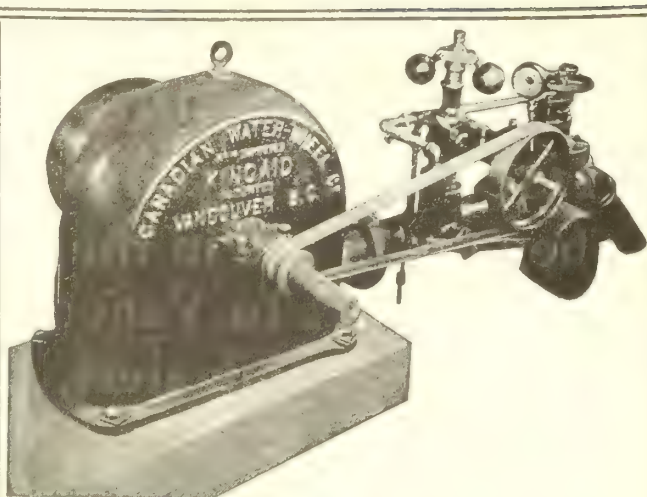
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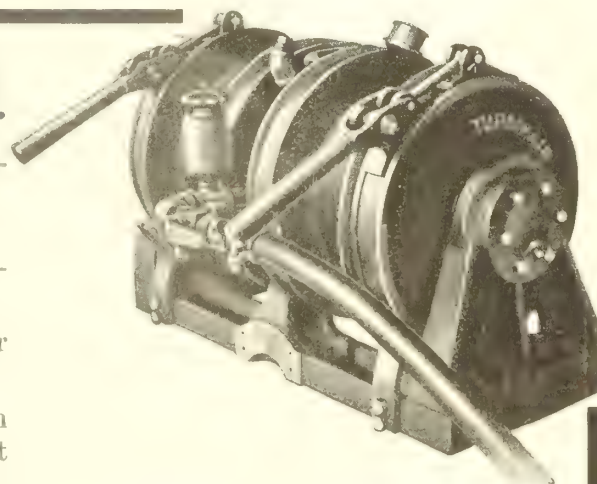
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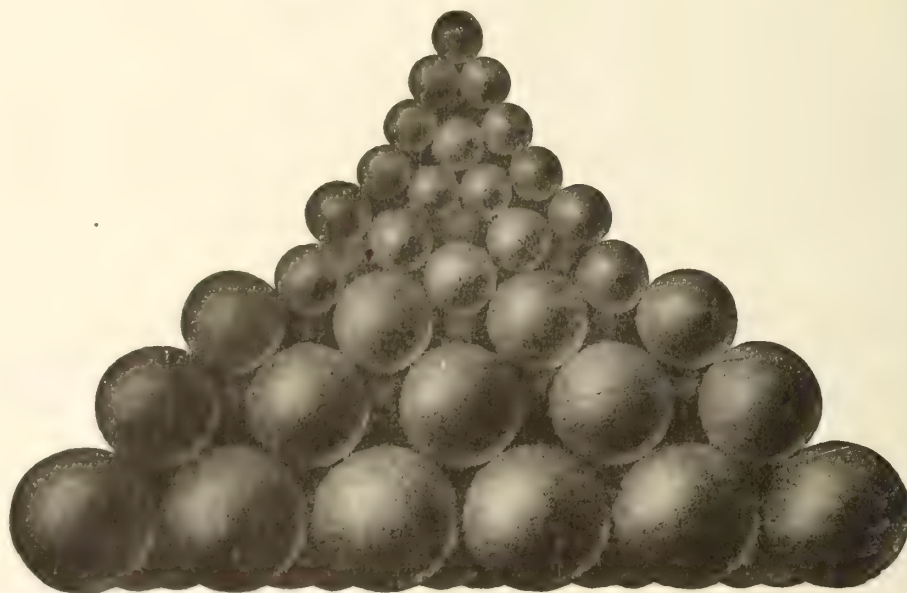
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# Canadian Mining Journal

PUBLISHED WEEKLY

Devoted to the Science and Practice of Mining, Metallurgy and the Allied Industries; and more particularly to their progress in Canada

VOL XLIV

GARDENVALE, QUE., January 12th, 1923

No. 2

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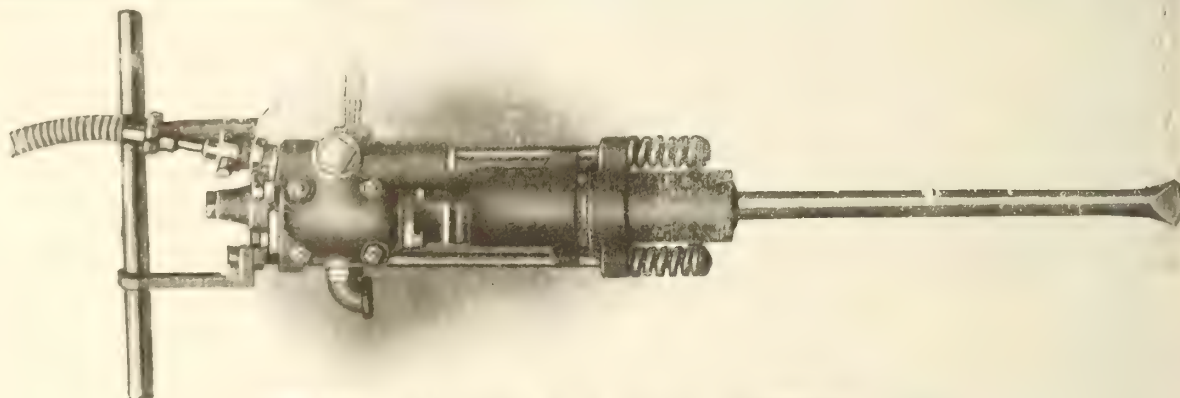
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## -:- EDITORIAL -:-

*The work of the miner has one great distinction over most other commercial enterprises. He does not merely divert wealth from some distant channel to that one in which he is interested, but he actually creates wealth, by bringing into use material which otherwise would remain inert and useless — J. B. Porter — 1897*

### A "DANGER SIGNAL"

Moved by Mr. W. S. Johnson, and seconded by Capt. J. G. Ross, that Council were gratified to feel that the work of the Institute was of sufficient interest and value to warrant financial contributions from mining corporations in support of Institute activities and that the Council are pleased to accept such contributions that are offered in the same way and under the same conditions as any grants made by Federal and Provincial Governments. Council desires to record its appreciation of the President's (Mr. W. R. Wilson) offer to recommend that his Company make such a donation, and hope that his example will be followed by others doing likewise." The motion was carried.

This is a minute of the last meeting of Council of the Canadian Institute of Mining and Metallurgy, open for every member of the Institute to read in the minute-book at Headquarters. We print it here because very few of the members will have an opportunity of reading it in the original; and we draw attention to it because we consider it to be a move fraught with very grave danger to the Institute.

As expressed in the above motion, the receipt by the Institute of donations of money from mining companies is merely "quid pro quo", and the Institute is only getting its deserts. The parallel with subsidies from governments also is convincing, so far as it is stated. But it is what is not stated by the motion, and that would escape the notice of the casual reader, that is ominous of danger not only to the dignity of the Institute but to its useful existence.

On numerous occasions, both public and private, the virtual control exerted over the Institute by the Federal government by virtue of its annual contribution to the funds has been a matter of discussion. Many a motion designed to influence government policies or the expenditure of public funds has felt the curbing effect of this control; and many a member has wished, both audibly and beneath his breath, that the Institute were free to speak the unfettered truth. Still, it has been expedient to bear the shackles of this mild form

of government control for the sake of the undoubted benefits that result.

The present motion of Council has laid the Institute open to be bound, hand and foot, by fetters that can confine it much more closely than any Government subsidy, could ever do. At the worst, a government subsidy can be the means of impressing upon the Institute the will of a public servant whose poor judgment or self-seeking has led him astray; but he can be removed from public office and his influence thus nullified in a moment. At the worst, the acceptance of a subsidy from a mining corporation whose motives are not of the best can constitute an eternal obligation, from which the Institute can never escape so long as the company's management wishes to impose its will. There are undoubted facts, as a little reflection will show; and though they state the extreme to which the Institute could be controlled by financial benefactors, this extreme case must be considered in judging of the position in which the Institute is now placed by Council's action.

It were far better that, if gifts of money are to be received, they should come from private individuals. It is a well-known fact that, on this continent at least, a man in his private capacity is much more likely to be scrupulous than when he is acting on behalf of a company or corporation. The "soul-less corporation" is not a mere figment of the imagination; it is a factor in modern business that is clearly recognized and discreetly dealt with by men of business. In the specific instance with which Council have dealt in their motion, the individual comprises the corporation, and thus the Institute is safe. We suspect that the personality of the donor in this case and his undoubted sincerity and good will have prevented Council from examining the general case in a searching way and thus have caused them to make this grievous error in judgment.

The Canadian Institute of Mining and Metallurgy has a fine inheritance from its founders. If this inheritance is to be handed down unimpaired to our successors, the members in general must repudiate this action of their Council. Let us beware lest we sell our inheritance for a mess of pottage.



## STRAWS

The wind bloweth where it listeth, but our meteorological savants record and even predict its every whiff. The "higher development of common knowledge," to use Herbert Spencer's phrase, has enabled scientists to discover and utilize the laws that govern the movements of the wind.

The closer study of international finance has given definite significance to the apparently arbitrary currents and cross-currents of the interchange of gold and silver.

In the case of gold, it is common knowledge that the United States, through causes incidental to the Great War, has become the largest importer of that precious metal. But it is not yet widely known that a radical change is setting in. During the first eleven months of the year 1921 our neighbor's imports of gold amounted to \$660,000,000; but during the first eleven months of the year that has just ended, the gold imports totalled only \$249,000,000, which means a decrease of 62 per cent. Such a falling-off is unprecedented in any year for the past decade. It is fraught with greater meaning, however, in view of the fact that exports of gold are growing at such a rate that financiers predict that they will soon exceed imports in volume. It is thought that not even payments on account of the allied debts will effectually counteract this outward flow.

There are too many factors entering into the situation to permit of a simple analysis. But one thing is evident, and that is that tremendously increased industrial activity in other countries is reacting on the United States. It would seem, also, that the new tariff regulations that our neighbor has put into force have stimulated exports of gold. Be that as it may, the United States is gradually approaching its pre-war status in the matter of gold reserves.

The international position of silver is quite as interesting as that of gold. Provisional estimates of the world's consumption of silver during the year 1922 place it at 307,000,000 ounces. The world's output for the year was only 200,000,000. Consumption in the Far East, China and India principally, amounted to about 220,000,000 ounces.

The expected output for the coming year, provided the lead and copper markets remain firm, is put at 225,000,000 ounces. The proviso is necessary, since approximately 70 per cent. of the world's production is derived as a by-product from copper, lead and zinc mines. The expected demand for silver during 1923 is placed at 280,000,000 ounces.

Thus, it seems, there will be a cumulative shortage of about 160,000,000 ounces. The deficiency between consumption and output was made up, in part, during the past year by the conversion of European coinage into bullion. How far this may be a factor in meeting

the current year's demands is not known. But it is certain that China and India will soon have to resume coinage of silver on a large scale.

Altogether the outlook for silver is very bright indeed.

For gold mining it need only be said that all things seem to conspire to encourage it the world over, and in no country to such an extent as in Canada.

## THE NON-METALLIC MINERALS

It is a truism that the metals, and particularly the precious metals, tend to monopolise the attention of those interested in the mineral industry. This is a tendency to be mildly, but actively and continuously, combatted if we are to have a well-rounded mineral development.

During the past six months the *Journal* has paid a good deal of attention to feldspar. Feldspar is only a moderately important mineral; the annual production of raw feldspar on the North American continent has a value of only about a million dollars. But it has been convenient to treat the subject of feldspar at some length, and the discussion (which still continues) will, we hope, prove to be of considerable benefit. Today, for instance, Mr. R. F. Segsworth, who has investigated with great care during the past three years the possibility of a profitable export trade in feldspar to England, points out that the rather pessimistic conclusions of Mr. Davis, and of Mr. Spence, who examined the case on behalf of the Mines Branch, Ottawa, can hardly be based on authoritative and recent data. We have read the correspondence to which Mr. Segsworth refers, and find his conclusion inevitable from the data presented. Indeed, one correspondent representing a large and long-established English firm commenced his correspondence with Mr. Segsworth with the statement that an export trade in Canadian feldspar could not be conducted profitably, and after a thorough investigation was compelled to reverse his decision, and was impelled to set down some of the hopeful statements quoted in the letter we print today. We hope there will be more discussion of this point, which will help still further to illuminate the question.

What we wish to point out particularly today, however, is that feldspar is only one of the numerous non-metalliferous minerals that we have in abundance in Canada, whose present neglect or merely partial use is due to lack of well-directed human initiative. We have rock salt, gypsum, magnesite, soapstone, chemical limestone, quartzite, clay of all grades, bentonite — all waiting to be turned into cold cash by men of creative imagination and managerial ability. All of us interested in the mining industry, should aid such men to vision such opportunities for the commercial use of these minerals as may exist, and then should give

them all the assistance possible to bring the vision down to earth.

The *Journal* includes among its New Year's resolutions the determination to lose no opportunity of forwarding the interests of non-metallic mineral production in Canada.

#### FELLOWSHIP FOR ASBESTOS RESEARCH

During recent months *The Canadian Mining Journal* has on numerous occasions pressed the importance of industrial research to Canada. We have now the pleasure of noticing a move on the part of a prominent mining corporation that is very much to its credit, and that speaks well for the spirit in which its operations are directed. The announcement is made in the December issue of *Asbestos*.

Consolidated Asbestos, Limited, whose mines are in the Thetford district of Quebec and whose head office is in Montreal, have established at the Mellon Institute of Industrial Research, University of Pittsburgh, a fellowship, to be known as the "Chrysotile Fellowship." The researcher holding this fellowship will apply his efforts toward extending the present uses of asbestos and finding new uses. Consolidated Asbestos have invited the co-operation of all and sundry interested in the asbestos trade in providing problems and ideas for the researcher to work on, and express the conviction that this general service to the industry as a whole will, in the long run, amply repay them for the funds thus invested.

This move shows public spirit on the part of the directors of Consolidated Asbestos, as well as an appreciation of the trend of the times in industrial management. It also is, most decidedly, good business to invest a modest sum annually in this way. They are, we believe, the first among Canadian mining companies to take this step, and we offer them our hearty congratulations on being at the head of what we hope will be a procession of mining corporations that will follow their lead.

There is one aspect of this case, however, that cannot but be of grave concern to any thoughtful Canadian. The "Chrysotile Fellowship" is to be held at the Mellon Institute in Pittsburgh. This is the logical place for it to be held. Why? — because there is no corresponding institute of industrial research in Canada where the researcher could employ himself effectively. It was precisely to meet this need that the Advisory Research Council at Ottawa proposed, three years ago, that a National Research Institute for Canada should be founded. It has not been founded, nor has any alternative provision been made to provide the facilities for general industrial and scientific research that are so urgently required. The founding of this new Canadian research fellowship in an American institute is a definite instance to prove the present

lack of the required facility in Canada, and to indicate the pressing need for establishing it immediately.

#### EDITORIAL NOTES

In "Letters from Porcupine," in our issue of November 17th, it was stated, as an instance where "high grading" is a venial sin, that "a Canadian professor was observed surreptitiously jamming a few of the choicest pieces into his side pocket," from the dump of a northern gold mine. On the face of it, this remark is meant to be a shrewd hit at the well-known specimen-collecting tendency of all professors. We find, however, after some private discussion, that the implication in this case is quite without foundation; the professor in question did not, on that or any other occasion, appropriate choice samples as stated. We therefore take this occasion of denying the allegation; we cannot "defy the alligator," because we have involved ourselves with the writer, by allowing the statement to get into print in our pages. The paragraph has been taken seriously by a number of our readers, and has been interpreted in a light that did not strike us at all on first reading, else it would never have passed the editorial censorship. We regret that any statement should have been circulated through our agency that could be construed as a reflection on the character of Canadian professors — the particular professor having remained un-named and many therefore, being involved.

Dr. Allan's excellent resumé of the progress of mining in Alberta during 1922, which we publish today, arrived too late for inclusion in the annual review number last week, for which it was intended.

#### THE ARTIFICER

The canopy of night is cobalt, sprent  
With silver curiously wrought. The pent  
Gold of the rising and the setting sun  
Is only little part of what is done  
By the Artificer whose high delight  
Is His own handiwork in making bright  
Earth, sea, and sky with colours from the ore  
Which Nature's mystic crucibles do pour.  
The opalescent miracle of dawn;  
The amethystine sky when day is gone;  
The emerald green of earth when Spring is young;  
The crystal wonders of the North, unsung;  
That iridescent marriage of all metals,  
The Northern Lights; the colouring of petals;  
The bloom on woman's cheek; the very blush  
That crimsons mine when I am writting slush;  
All come from Nature's smelter: She's a miner.  
Likewise a metallurgical refiner

J. C. M.



# The Rehabilitation of Gold Mining in Nova Scotia

A. E. FLYNN,\* A. R. S. M.

At the present time much thought is being given to the possibility of the re-establishment of gold mining as an industry in this province. Questions such as these are asked: Is the gold industry dead, or only dormant? What is the cause of the present inactivity? Can anything be done to improve matters? Why is no effort being made to look into the situation? There is a decided feeling that we have allowed a valuable industry to fall into a decline and have done nothing to succour it.

## *Workable Ore Bodies Available*

The exploitation of a natural resource such as gold is of great importance to any country and should be given every consideration. This consideration has not been given to the industry in Nova Scotia for the last fifteen years, during which time it has been most needed. Since gold was first discovered 60 years ago the average annual production has been 10,000 ounces while it has amounted to over 31,000 ounces in one year. Since 1905 the production has gradually fallen from the average figure to practically nothing. When we consider that there are many mining properties in the province showing bodies of workable ore that are not being worked, the situation certainly calls for attention. The fact that we have workable bodies of ore awaiting development and other deposits that have a good chance of becoming workable shows that the industry is not dead but only dormant.

## *Reasons for Failure*

In approaching the question of the rehabilitation of the industry we must first consider why the former operating mines have ceased operation. Stated briefly we can say that they ceased to pay; that is, they could no longer produce gold at a profit. This does not necessarily mean that they have failed as mining ventures, as they may have made ample return to the operators during their existence. However, in this Province there is no hiding the fact that the great majority of the mines have failed. It must be called to mind that for a mine to be successful it must return to the operators an amount equal to their original investment plus a comparatively high rate of interest on this sum. Not many mines in Nova Scotia could claim this record.

There are many circumstances that lead to mine failures and I have made an attempt to collect and classify them, with some remarks on the circumvention of their effects. The events that cause failures may be said to come under two general classes, first, those that are beyond human control, and second, those that can be controlled; but as human control is so involved I prefer to consider the following classes—1. Geological; 2. Calamitous; 3. Market conditions; 4. Management; 5. Finance.

**Geological.**—Chiefly depletion of ore. (a) The ore may become poorer in grade, in which case costs must be lowered, preferably by improvement in mining and metallurgical methods. (b) Boundaries of ore-body reached, (b-1) artificial boundary (claim lines), (b-2) natural boundary (cessation of values, faults, pinches, etc.) in which case neighbouring land or mining rights must be acquired or geological investigation and exploration carried out.

**Calamitous.**—This would include cave-ins, flooding, fire, snowslides etc. Insurance and foresight can usually prevent the consequences of these from becoming fatal.

**Market Conditions.**—As gold has a standard value it is not affected. Supplies fuel (or power) and labour are affected, as are also any by-products of the ore.

**Management.**—I use this term in its broadest sense to include direction of affairs and policy. Bad management is one of the chief causes of failures and covers a big field. It would be out of place in this outline to attempt to enumerate the different ways in which the shortcomings of a manager can ruin a mine. They can all be covered by the word incompetence and, at times, dishonesty. It is important to note that when the management makes no effective effort to counteract the previously mentioned adverse conditions, the management must share in the responsibility for failure. This is the reason why in so many cases poor managing must stand the blame. The evidence is often seen in this Province in inadequate equipment, inefficient methods of mining and milling and lack of development policy, with the resultant high costs and a large part of the values going to waste.

**Financial.**—The mine may be over-capitalized or under-capitalized. It often happens that too much of the capital goes to the promoters or brokers and too little to the mine. Or again, in prosperous times excessive dividends are distributed, leaving no reserve for hard times. Mines frequently start up before their financing is completed and when the financing campaign fails there is often a loss in reorganizing and more often a complete failure of operations. Most fraudulent enterprises come under this heading. It is also probable that the majority of cases in which law-suits tie up operations would be included in this class.

In looking over the annual reports of the Mines Department of Nova Scotia I have picked out the different reasons given for the decline of the gold industry by the various engineers temporarily employed by the government. They are—

- Too many shafts.
- Expense of pumping too heavy.
- Stopes too wide.
- Too much overhead expense.
- Too many bogus companies and wildcatting.
- Attraction of capital and men to other booming camps.
- Insufficient capital.
- Unintelligent direction of operations.
- High cost of fuel.
- Lack of prospecting.
- Cave-in (in one case)
- Too much spent on surface equipment and not enough on underground development.
- Scarcity of water (in one year).
- Veins worked are too small or too low in grade.
- War-time conditions.

It will be seen from the above list that practically all the causes given are those that come under human control and that most of them can be attributed to bad management. This is significant. It is also a grave charge against the mining profession that will be resented by many. However, it must be borne in mind that the policy is often dictated by those who provide the capital, and these men do not usually belong to the mining profession.

## *Mr. Rickard's Report*

The only attempt to make a thorough investigation of the decline of the industry was made by T. A. Rickard in

\* Professor of Mining, Nova Scotia Technical College.



1907. His conclusions were that mining would only be successful as small units, involving little outlay of capital and operated by practical miners. This was disappointing to those who had been pinning their faith in large organized stock companies in the belief that the larger the scale of operations the less the cost of producing gold. They did not appreciate the fact that a large scale of operations is only justified when a large body of ore is proven. One cannot lose sight of the fact that, taken on the whole, our veins are narrow and the ore-shoots are small and are often scattered and hard to find when they do not crop out at the surface. A heavily capitalized mine could by extensive underground exploration bring the "blind" ore-shoots to light, but experience seems to show that the values extracted from the ore would only rarely pay for its finding and extraction. Conclusion similar to Rickard's have been arrived at by several engineers who have made a study of the situation, though there are others who do not hold the same views.

We cannot escape the fact that all the formerly operating mines (both large and small,) are to all intents and purposes dead, and the records they have left behind them are not encouraging. The Mines Department figures show that the average value of the crushed ore throughout the 60 years is only about \$8.70 per ton. This figure becomes much smaller if translated into value per ton mined, as the narrow veins entail the mining of a considerable proportion of worthless material that is not crushed. Taking these low values into account and considering the fact that a lot of money was invested in bogus companies and other mines that did not attain to the producing stage, one is tempted to say that more money has been put into gold mining in Nova Scotia than has been taken from the ground. However the figures of the Mines Department must be interpreted with strict regard to the fact that much of the gold was lost by poor extraction and that much low-grade material was mined that should not have been mined or crushed, while it is well known that some operators, to save the two percent royalty, did not make full returns, and also that the miners pilfered much gold.

Turning to the brighter side of the picture we can say that certain of the mines were successful, that we have exposures of payable ore awaiting development and that we can profit by past mistakes and modern methods. We can see a chance for the recuperation of the industry so long as it follows a carefully chosen policy and receives the proper guidance. The keynote of the situation is proper guidance; without it former mistakes will be repeated. We must provide the most competent management.

#### *Competent Guidance for Small Operators*

Whether the future of the industry depends on small mines or not, the mines will have to start up in a small way. It is idle to state that we have "Hollingers" ready to be worked. The Hollinger mine was not made in a day or in a year. If our small mines develop large quantities of ore they will then develop into large mines; but this can not be judged from the surface or from shallow workings. The chief thing we have to keep in mind is that small operators cannot afford expert management and without it they will go the way of their predecessors. The Government, through the Mines Department, can and should provide the necessary guidance. The Government, and the Government only, can provide the means for the rehabilitation of the industry. The Mines Department has done very little for the mines in the past and this is one of the grievances of the miners, who claim that they get nothing in return for their two percent royalty on

gold. On checking up the special provisions that may be said to assist the mining industry I find there are two. There is the Deep Mines Act, which assists deep shaft sinking and crosscutting; but this of no avail to the small operator. Then there is the provision under which the Mines Department may, when authorized by the Governor-in-Council, purchase boring machines, crushers and other mining machinery for testing deposits. The boring machines they have got and they are excellent for everything but gold. The mining machinery has never been purchased. In this connection I should like to point out that the Province has an eminently suited plant for testing small lots of ores in the Murray Mining Laboratory of the Nova Scotia Technical College. This should be taken advantage of, as I know there is even in these depressed times a big demand for the testing of ores. We can thus see that the small operator receives neither help nor encouragement and his problems and wants are little understood by his local Government. All his geological information he obtains from Ottawa. If he wants to know what values there are in the old dumps and how they may be best extracted, he can again obtain his information from Ottawa, not Halifax.

#### *A Neglected Industry*

The time has come for an accounting, and judging from results we can say that nothing effective has been done to prevent the decline of this basic industry. The Maritime Provinces as a whole have neglected their Mining Departments, with the result that the metal mining industry is not supported as it should be. This has led to a belief abroad that the mines of these Provinces are not worth considering. It is not an exaggeration to say that when promoters or capitalists are presented with similar mining propositions, one in the Maritimes and one in any other Province, that one in the former Provinces receives practically no consideration at all. Many of us have observed this. At present outsiders have a lack of confidence in metal mining in the Maritimes. Something must be done to remedy matters. We should follow the example of the other Provinces, who take good care to foster both prospecting and mining. Other Provinces are liberal with free grants of claims to original discoverers of mineral deposits; they will not allow claims to be held unless they are worked; little or no royalty is collected; a limited number of free assays are granted with each claim; ores are tested and small lots of concentrate are purchased; so-called Blue Sky laws are being enacted to eliminate fraudulent operations; and "high grading" laws are in force. Most important of all, they have Provincial Mineralogists, Geologists and Mining Engineers. It is the work of these men that does most for the development of their mineral resources.

#### *A Practical Suggestion*

Nova Scotia has great need for this addition to her Mines Department. As her geology has been so ably taken care of by the Dominion Government, her immediate need is for a Provincial Mining Engineer irrespective of the Deputy Minister, and he should be available as a consulting engineer to the small operators. By this means the necessary guidance can be provided for these small operators, and so the chief cause that has held back our successful business and professional men from taking up mining as an investment will be removed. Such men cannot be expected to know enough of mining to make a success of it on their own initiative, yet they are the ones who have provided the capital (and often the policy) in the past and will provide the capital in the future. We also need up-to-date reports on all our mineral resources and these should be distributed freely. This will do much



to create a new interest and confidence in mining in the Province.

In a general way the conditions necessary for the re-opening of mines are one or more of the following:

- Readjustment of market conditions.
- New mining methods and equipment.
- New metallurgical methods and equipment.
- New management and policy.
- New capital.
- More geological knowledge.
- More favourable laws.

Mining science has made long strides since Nova Scotia gold mining was in its prime so that if the Government will enact favourable provisions to foster and guide the industry we can be assured that it will re-establish itself and be on a firmer footing than formerly. The world is continually going farther afield to find gold and with the increasing difficulty of finding new mines more attention will be given to districts that have produced gold in the past.

A well manned department is also essential for the development of our other mineral resources, which are at present being neglected. Reference can be made to the oil shales of Pictou county, where a minimum of 400,000,000 barrels of oil can be obtained from a tract of land of about 10 square miles. The oil shale industry when developed will be comparable to the coal industry, yet nothing is being done to encourage its development. We have many other mineral deposits, specially non-metallic, which if properly exploited will give rise to staple industries and bring Nova Scotia to its proper position among her sister Provinces.

The Maritime Provinces are alike in their neglect of their mineral resources. They are acting together in their hydro-electric development and in University education to their mutual advantage. They have much in common. Could they not to advantage co-operate in the development of their mineral resources?

## Letters From Readers

*Campbell-Corless*

The Editor, Canadian Mining Journal.

Sir:

For many months now the Campbell-Corless controversy has waged in the *Canadian Mining Journal* and the *Bulletin of the Canadian Institute of Mining and Metallurgy*. So far it has been instructive, except when Mickle introduced mathematics, and it was also a serious discussion until J. C. M. made it an excuse for that "adjuration" in your issue of December 22, 1922. I think every unbiased reader will agree that both Mr. Campbell and Mr. Corless are absolutely correct and that both have proved that they are correct. That is, they are correct up to a certain point and then both make the same mistake: they take in too much territory. Corless' deductions are reasonable for the North Central mineral-bearing part of Canada with which he is familiar, and Campbell's reasoning is correct for the Western mineral-bearing portion of Canada with which he is familiar. As impure mathematics and worse poetry have been introduced into the discussion it is time to call a halt or the discussion will degenerate into an argument such as the benefits of the O. T. A., or Haultain's infamous query, "Why is a Geologist?" The discussion has proved one thing about mining engineers, even the top notchers, which I think ought to be emphasized, and that is that they, like less important individuals, are, in their mental attitude, entirely governed by their personal experiences. We are all familiar with the jibe of the near-engineer, "The mine makes the man." Equally true is it that a man's personal experience decides what his mental outlook shall be, whether he shall be an optimist or a pessimist. Take Corless and Campbell. Both graduated from McGill. Corless went to Sudbury and associated himself with the Mond Company, at that time operating in a small way. The uses of nickel increased, the ore-bodies proved year by year to be larger and richer than hoped for. Corless rose from underground foreman of the Victoria mine to Managing Director of the Mond Nickel Company, now one of the strongest metal companies in the world. During the past twenty years, in addition to seeing the marvellous growth of his own company, he has seen the Sudbury district prove to be one of the greatest store-houses of mineral wealth in the world, with a century's supply of ore in sight. During the same period Cobalt, one of the greatest silver camps in the world, was discovered

a few miles from his own district and, a little further away, Porcupine and Kikland Lake appeared on the horizon and in a few short years the Hollinger took its place as the leading gold mine in the world. No wonder Corless throws his hat in the air and shouts, "There is no limit."

Now follow Campbell. Looking into the future and realizing what Montreal would be in 1922, he tried to get as far away as possible and only the Pacific Ocean stopped his flight. He associated himself with the Granby Company and from that day to this it has been one long, heart-breaking struggle to make payable ore out of mineralized country rock. When he would succeed in cutting down costs till a profit was in sight, the mine would bottom and the same thankless attempt would have to be made elsewhere, generally with the same result. And what of his neighbors? The same story, only more so. Campbell has only seen one first-class mine, the Premier, discovered in the past twenty years in his province. Is it any wonder that after twenty years of such disappointments and disillusionments he looks into the future and says, "The worst is yet to come?"

Is it not improbable that if twenty years ago Corless had gone to the Granby and Campbell to the Mond, Mickle today would be proving by Dr. Coue's well-known mathematical law that every day, in every way, Corless is getting wronger and wronger!

Toronto, Ont.

X. B. C.

*Alberta Provincial Geological Survey*

The Editor, Canadian Mining Journal.

Sir.—

In order that any misunderstanding that might have arisen, may be cleared away, I wish to draw attention to the editorial that appeared in your *Journal*, September 29, 1922, under the title "The Provincial Geological Surveys." In this editorial your remark on the Alberta Geological Survey is worded in such a way that the reader is apt to get a wrong impression of what was meant. I refer to the words, "are somewhat shrouded in mystery." I have been instructed by the Scientific and Industrial Research Council of Alberta to write you a word of explanation on this matter. It would have been fairer to the province to have stated that Alberta was one of the provinces that

have not yet been given control over their natural resources. Under these conditions, one could hardly expect the province to organize a department under the title "Provincial Geological Survey." It is the duty of the federal geological survey to investigate the geology of all of the provinces and more attention might be given to those provinces that do not control their mineral resources.

In 1919 the first step was taken by the provincial government to compile data regarding the mineral resources of Alberta. This can be regarded as the beginning of a geological survey. In the following year the "Scientific and Industrial Research Council of Alberta" was organized and a department was started under the roof of the provincial University but directed by the Council. The Hon. J. L. Côté, late Provincial Secretary, was largely responsible for the organization of this department. The original Council consisted of the Provincial Secretary under whose department the appropriation for this work was administered; Mr. J. T. Stirling, Chief Inspector of Mines, representing the Government; Dr. H. M. Tory, representing the University; Professor N. C. Pitcher, Mining Engineer; and Professor J. A. Allan, Geologist.

In 1921 the Council appointed Mr. Edgar Stansfield, Chief Chemical Engineer, and Dr. K. A. Clark, Research Engineer on road materials. Mr. Stansfield was appointed to the Council as Honorary Secretary, and with the change of government, Premier Greenfield as Provincial Secretary, became chairman of the Council.

Up to date two annual reports have been published by the Scientific and Industrial Research Council. These describe the character of work carried on within this department. Investigations are being carried out under the following divisions: fuels, including sampling, screening, storing, burning, carbonization, and purification of coals and boiler trials on the coals tested; investigation of road problems and the extraction of bitumen from the Athabaska bituminous sands for the purpose of road dressing; preliminary investigations on mineral deposits; investigation of forest products.

The geological division has published annual reports on the geology of certain areas. Three have already appeared, beginning 1919, and the fourth annual report is in the course of preparation. The first two reports contain notes on the various minerals that are known to occur in this province; the third annual report deals with the geology of the Drumheller coal basin, which is the most important district in Alberta producing domestic coal today. The fourth annual report is now in preparation and contains the results of detailed investigations carried out in two fields.

When the time comes that the province controls its mineral resources, there is no doubt that the geological work, at least, will be carried out in accordance with the general practice adopted in other provinces. It is therefore not the intention of those concerned to "shroud in mystery" the geological work which is being carried on in Alberta under the authorization of the provincial government.

Edmonton, Alberta.

John A. Allan

*Editor's Note.*—The paragraph referred to in the *Journal* of September 29th is as follows.—"Alberta has now a well-established geological survey, though its activities are somewhat shrouded in mystery under the name of its executive body, the Scientific and Industrial Research Council of Alberta. What we would judge to be a systematic and sustained effort has been commenced by officers of this department with the object of making immediately available the aid of geological service in the commercial development of the province's minerals."

### *Export of Feldspar to Britain*

To the Editor, Canadian Mining Journal:  
Sir:

Mr. N. B. Davis's letter published in your issue of December 29th, contains statements so contrary to ascertainable facts that I am quite at a loss to imagine where and how he gathered his misinformation.

To show the appalling inaccuracy of some of Mr. Davis's positive assertions I have but to establish a "deadly parallel" between them and the authoritative and committal statements of responsible English firms who are ready to do business. Circumstances do not permit of my quoting any names, but I shall at any time be glad to exhibit to you, Mr. Editor, the originals of all letters from which quotations are made. I may add that the letters, all from firms of high standing, demonstrate that the impression that Mr. Davis seeks to convey concerning the overseas market is astonishingly wrong — how wrong your readers can judge for themselves.

*Mr. Davis*

What feldspar is now being used in Staffordshire is being laid down at the mills for approximately \$10.00 per ton.

*The Other Side*

A fair price for lump feldspar today is \$26 to \$40 per ton and for the ground in bags, \$15 extra ex-store English port.—*From letter dated Nov. 23, 1920.*

The biggest consumption of crude feldspar in England is of a grade that sells in the neighborhood of £4 per ton. Ground feldspar is sold at very much higher prices, which must leave a good margin of profit to the grinder. We have succeeded in interesting all the more important grinders in the possibility of our supplying them with Canadian spar.—*From letter dated Sept. 1st, 1922.*

We are buying the pulverized Norwegian feldspar today at £11 per ton at Port. We can buy Swedish lump feldspar at about £5.10.0 per ton at the port.—*From letter dated Feb. 18th, 1921.*

We are indeed pleased to hear that there is a possibility of bringing Canadian feldspar to this country.

It was intimated to us some little time ago that we should be communicated with in reference to placing Canadian feldspar, not only in this country but abroad.—*From letter dated Nov. 23rd, 1920.*

It certainly would be useful to know that there

The Editor is apparently not familiar with the ways of the English Potter, or he would not suggest that it is quite possible that the use of Canadian spar might be a decided advantage.



was an alternative source of supply of suitable material.— *From letter dated Dec. 9th, 1920.*

A market undoubtedly exists in Great Britain for 15,000 to 25,000 tons of crude No. 2 feldspar (\$20 per ton is the price indicated).— *From letter dated July 3rd, 1922.*

While the British market may eventually be captured by Canadian spar it will take time.— *From letter dated Sept. 1st, 1922.*

The facts of the case are that Great Britain requires annually about 50,000 tons of feldspar of which 36,000 tons is supplied in the form of 60,000 tons of china stone, the remainder being imported. On its merits, Canadian feldspar is superior to any material used in Great Britain. What has chiefly militated against beginning an export trade has been prohibitory freight rates. Recently these have been so modified as to make trans-Atlantic shipments a commercial possibility.

The regrettable thing is that in the face of these facts Mr. Davis should be capable of publishing erroneous and discouraging reports.

Because the letters that I have quoted from are private, I have been unable to use the most effective paragraphs. I think, however, that I have reproduced enough to show that there is an English market for Canadian feldspar. To secure it requires enterprise and effort and the co-operation of the Government.

Toronto, Ont.

R. F. SEGSWORTH.

#### *Re. Future of Feldspar*

The Editor, Canadian Mining Journal.

Sir:— I was much surprised to note the uncomplimentary reference made by Mr. J. C. Murray towards Mines Branch officials, in his article on feldspar in the Dec. 29th issue of the *Journal*. I feel that I must go into print again in their defence, as I know they are in closer touch with all phases of the so-called feldspar situation than a number of their critics.

In Canada our chief interest is as producers, and, until such time as the consumers, particularly in the United States, are in agreement as to standards or specifications, there is nothing to be gained by the Canadian Mines Branch taking up the matter. Mr. Murray referred to the zeal shown by the U. S. Bureau of Mines in investigating conditions, but he did not intimate that the enquiry was undertaken at the request of a few consumers. The producers did not ask for it.

After a year's discussion, the matter has come down to a point where the consumers represented in the American Ceramic Society have been asked to formulate a set of standards. Individual Mills now set their own standards for buying from independent producers, and these standards are easily understood; hence, any honest, intelligent producer can control his product to a given standard, as it is simply a matter of grading as to purity, and the assistance of the Mines Branch officials should not be required.

N. B. DAVIS.

## OBITUARY

### JOHN WADDELL

On Friday, January 5th, John Waddell, associate professor of chemistry at Queen's University, Kingston, died in the Royal Victoria Hospital, Montreal, of pneumonia, contracted earlier in the same week during a holiday visit to Montreal.

Dr. Waddell was a Nova Scotian by birth, and studied at Mount Allison, in London and Edinburgh and in Heidelberg, taking degrees from all these places.

On his return to Canada he was in charge of the chemistry department of the Royal Military College, Kingston, for a number of years and then joined the chemistry staff of Queen's University, where he taught until his death. His untimely death at the comparatively early age of 62 removes one of the few remaining "old-timers" from the staff of the University.

A large circle of mining men, from Atlantic to Pacific, will long remember Dr. Waddell for the keen personal interest he took in their progress when they studied chemistry under his charge. His meticulous care and his insistence upon thoroughness have opened the eyes of many to the utility of these rare qualities. Dr. Waddell exerted to a notable extent upon his students that influence for good which is the teacher's privilege.

A widow and two daughters survive. To them the *Canadian Mining Journal* tenders its sincere sympathy.

### MANGANESE IN UNITED STATES IN 1922

Manganese ore containing 35 per cent. or more of manganese shipped from domestic mines in 1922, according to figures compiled by the United States Geological Survey from reports of producers of manganese, amounted to about 13,500 gross tons, valued at \$457,000. The ore of this grade shipped in 1921 amounted to 13,531 gross tons, valued at \$495,097. The figures for 1922 represented the actual production for 11 months plus an estimate of the production in December. More than 10,000 tons of this ore was mined in Montana.

The new tariff act, which became effective September 21, 1922, provides for a duty of \$8 a ton on ore containing 40 per cent. of manganese, \$9 a ton on ore containing 45 per cent. of manganese, \$10 a ton on ore containing 50 per cent. of manganese, and so on. Manganese should therefore bring an average price on the eastern seaboard amounting to the present average price of foreign ore plus about \$9 a ton. The new tariff has not yet greatly affected the domestic manganese market, for even under its provisions not many domestic mines can be operated at a good profit; but the owners of mines that have heretofore been worked profitably have shown a renewal of interest in the industry and some of the mines that are already developed and that yield ore of high grade will probably be reopened.

About 352,000 gross tons of ore containing 10 to 35 per cent. of manganese, valued at about \$1,232,000, was mined in 1922, as compared with 8,439 gross tons, valued at \$442,755, in 1921. About 308,000 tons of the ore of this grade shipped in 1922 was mined in Minnesota.

Up to September 21 manganese ore amounting to 266,969 gross tons, valued at \$2,324,989, had been imported into the United States in 1922, most of it from Brazil.



# Hiram Donkin

AN APPRECIATION BY AN OLD FRIEND AND CO-WORKER

After a long, active life, during which he helped to build the first Canadian railways, managed the largest collieries in Canada, and afterwards as Deputy Commissioner of Public Works and Mines planned the building of the public highways of Nova Scotia and supervised the inspection of the collieries, Hiram Donkin has retired from the Mines Department of Nova Scotia at the end of December last.

The many friends of Mr. Donkin, everywhere, are pleased to know that his faithful services to his country have been recognized and that one of the hardest working of public servants is to be allowed a breathing spell in the evening of his life. This is only as it should be. Loyalty and devotion to duty are inborn characteristics of Mr. Donkin and it is good to learn that his experience and advice are to be retained to benefit his Province. Monetary compensation for past services is meagre recognition compared to the knowledge that the youth of the present is still to have the benefit of the advice of the matured worker. In this case a fine precedent has been set.

Mr. Donkin is seventy-six and is still stalwart in appearance. Wherever he has labored, whether in the Prairie Provinces building railways, or in Nova Scotia at the collieries, he has been always held in high esteem. I first got to know him when he was General Manager of the Dominion collieries, and learned to like him, although by times our ways did not seem to run together. But, although opinions differed, yet it can be said of Mr. Donkin that he was always fair and never tried to use his position to further his own or his company's interests at the expense of others. I once overheard a group of railway men say that Hiram Donkin was a "white man," a very emphatic expression when applied to character; and while I was only a stranger among them, inwardly I heartily agreed with them.

Mr. Donkin is a big, quiet, kindly man, more fond of his home and the wild woods of his native country

We are pleased to have for publication the above appreciation of the character and public services of Mr. Hiram Donkin. Mr. Donkin has for many years discharged the duties of deputy chief of the Mines Department in Halifax, and now is superannuated, ripe in years and with an enviable record of work well done. Mr. Donkin's successor, Mr. T. J. Brown, comes likewise direct from successful management in the province's coal fields, where he has been in the mining business for over forty years, his late position being general superintendent for the Nova Scotia Steel and Coal Company. He enjoys in unusual degree the confidence and respect of the miners of Cape Breton, to whom he is intimately known, as well as the general regard of the business public of Nova Scotia. We hope that Mr. Brown will, in the midst of his principal duties hingeing on coal production, find time and energy to devote to the mining of the other minerals with which Providence has endowed his native province. —Editor, C. M. J.

than of mixing in society. In other words he is not a "club man." He has his own decided views about living, and once I heard him say that the man who did not love the forest, a pipe and a horse was not fit company for any person. Much of the life work of Mr. Donkin was spent in the great solitudes of Canada and he found that life "more sweet than that of painted pomp." He has been fond of out-door life and it has had a strong appeal to his robust, healthy nature. He has felt its call and through most of a long life, has responded to it.



MR. HIRAM DONKIN

"Now the gorges break, and the streamlets wake,  
And the sap begins to flow,  
And each green bud that stirs my blood.  
Is a summons, and I must go."

The woods is in Mr. Donkin's blood and bones, and it is a real pleasure to sit and listen as he relates his rambles through the great primeval forests, with a heart full of reverence and of the romance that fills the true lover who seeks to spend his every hour in the presence of his well beloved. Born at River Philip, in



Cumberland, Nova Scotia, he delighted in those early years "when the wintry sun the day had closed" to trail away to a neighboring farm to spend the evening with friends, and return through the great forest he loved with bounding heart and light springing foot step.

To see Mr. Donkin toiling day after day down in that subterranean little sunless office of the Mines Department and to know his love of the sunshine and of all nature, was in some measure to understand how his whole being must have continually protested against those pent-in quarters and close confinement, and how he longed for the day to come when he could bid a long good-bye and feel free to return, even for a short time, to the "trails of men."

Mr. Donkin was educated in the Great Common School of hard knocks and experience, where many others of the early Canadian pioneers had their training. Under E. H. Keating, who in after years was city engineer in succession of Halifax, Duluth and Toronto, and later in charge of the Government Railway between Truro and Pictou, Mr. Donkin worked as chainman, levelman and rodman until he was put in charge of a transit. From there he went to Northern New Brunswick, following the same line of work. He came back to work on the eastern extension of the I. C. R. between New Glasgow and the Strait of Canso. From there he went to Vermillion Bay, between Winnipeg and Lake Superior, as Government engineer on the Canadian Pacific Railway, which was then being built. After this railway had been completed to Port Arthur and taken over by the C. P. R. he went north of Lake Superior, where he became a railway contractor.

In 1885 he came back to Nova Scotia and built the eastern extension of the Intercolonial Railway from the Strait of Canso to Sydney. In 1891 this part of the road was completed, but the claims for extras were not settled, and Mr. Donkin had to spend a year in Ottawa until the claimants were satisfied. In 1893 he was appointed resident manager of the Dominion Coal Company, and put the railway through from Sydney to Louisburg.

Three years later he was appointed general manager for the Dominion Coal Company. He served five years in this important position, during which time coal mining in Cape Breton was revolutionized, mining machinery was introduced and the coal industry experienced a great expansion. In 1901 he went back with the Nova Scotia Government, and afterwards did some work for the Cumberland Coal and Railway Company, and the McKenzie & Mann, Company at Inverness; also the Nova Scotia Steel and Coal Company. In 1904 he was appointed mining engineer of the Dominion Coal Company and in 1908 was asked to accept a position in the Mines Department, Halifax, as Deputy Commissioner of Public Works and Mines. In this, as in all his other positions he was highly successful, and filled it with ability. That he may long live to enjoy the fruits of his labors, is the wish of his host of friends throughout Canada.

JOHN MOFFATT.

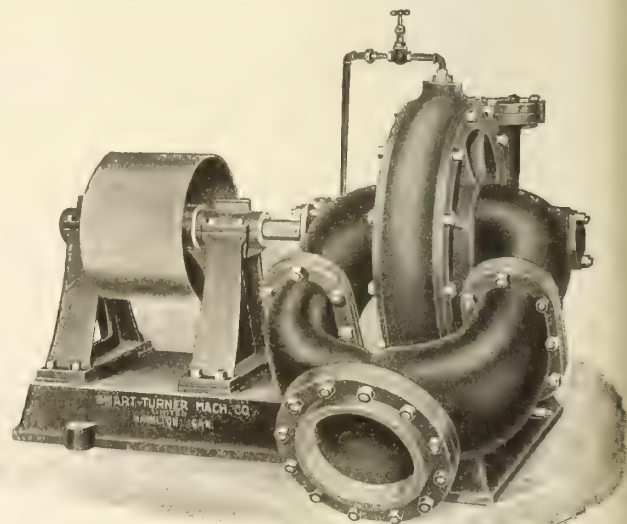
Preliminary returns of bituminous coal production in the United States during 1922 indicate a total of about 408,000,000 tons, which is practically the same as the 1921 production.

## THE MINES ALONG THE T. & N. O. RAILWAY

The annual report for 1921 of Mr. A. A. Cole, mining engineer to the Temiskaming and Northern Ontario Railway Commission, was issued in December last. It contains, as usual, a wealth of detailed information about the silver mines of Cobalt and the gold mines of Porcupine and Kirkland Lake. A number of the outlying non-producing gold areas are mentioned briefly, as well as the barite deposits of Elk Lake, Yarrow and Matachewan. The statistics as to production, costs, and methods at the gold and silver mines and mills, here collected in one place, form a valuable repository of precise information.

## CENTRIFUGAL PUMP

One of the new designs of centrifugal pump, as built by the Smart Turner Machine Co., Ltd., Hamilton, Ont., is shown by the accompanying illustration. The pump is of the double suction pattern, consisting of a scroll shell, with two shell sides and a Y suction pipe. The suction pipe on the pulley side is provided with a water-sealed stuffing box and a brass-lined journal to



support the end of the shaft. The shell sides may be removed for inspection of the impeller without disturbing the Y suction pipe. The impeller is of the enclosed type, is designed for the required capacity and head, and is highly finished. The pedestals are of the self-oiling type. The whole pump is liberally proportioned for hard service. It is built in sizes from two and a half to twelve inch discharge. While the illustration shows the pump for belt drive, it is also built for direct connection to electric motor, steam or gasoline engine.

The value of hydro-electric energy as conserving coal consumption in Canada may be partly gauged by the fact that only one and a half per cent. of the total coal consumption takes place in central electric power stations. In the United States 2.6 per cent. and in the United Kingdom 9.7 per cent. of the total coal consumption occurs in these stations. In 1920 over 97 per cent. of all the power output from central stations in Canada was produced from water-power. The steady growth of water-power development during the past two years indicates that this proportion will be maintained or even increased.



# Mining Industry in Alberta in 1922

By JOHN A. ALLAN\*

Mineral production during the year 1922 has been confined largely to coal. Metal mining possibilities within Alberta are relatively unimportant. Mineral development has shown signs of increased activity during the year. According to returns for 1921, Alberta ranked fourth in Canada as a mineral producer. The mineral products for that year were valued at almost twenty-nine million dollars, which represented 16.8% of the total production for Canada, and a decrease in production of 16.1 % below the previous year. The returns for 1922 are not yet complete for Alberta, but it is believed that the value of the total mineral production will be just about the same, or possibly slightly higher than in 1921 in spite of the adverse labor conditions in the form of strikes which prevented normal production from the coal mines.

## Coal

The coal mining industry in Alberta in 1922 has been struggling almost continuously with labor troubles. The mines in District 18, which includes all the districts from Drumheller and Brazeau south to the international boundary line, were closed by a strike that lasted from April 1st to August 28th — almost five months. It is estimated that this strike cost the operators approximately \$9,000,000, while the miners lost in wages about \$3,500,000.

A Conciliation Board was appointed in April, under the Lemieux Act. The report of this Board was not accepted, but an agreement between the Western Canada Coal Operators' Association and the miners was reached on August 25th, whereby work was resumed at the old rate. Since the mines resumed work, the rate of production has increased rapidly. At the end of October the output for Alberta was 300,000 tons less than on the same date the previous year. In October the output was 925,000 tons, which is the highest on record. Of this total, 250,000 tons were mined from Drumheller field. On October 16th., 304 cars were shipped from this one field.

In November an attempt was made on the part of the U. M. W. A. to organize the Edmonton field. A strike was called on December 4th. in spite of the fact that the majority of the miners were willing to work. An attempt was made to picket the miners who were willing to go to work. The situation has continued to become more serious, and many accidents have occurred to date (December 29th). Most of the mines are working, but far below capacity.

Most of the mines west of Edmonton have continued to produce throughout the year. A fire in Mountain Park Collieries in January did considerable damage. A serious fire broke out in Yellowhead Mine at Coal-spur on November 25th, and is still burning. Spontaneous combustion is stated to have been the cause. In an attempt to investigate the fire three men lost their lives on November 27th: Wm. Shaw, mine inspector; E. Roberts, mine manager; and Hiram Davis, miner,

It is estimated that the coal output for this year will be between five and one half and six million tons.

The Alberta Government has made a continuous effort to extend the use of Alberta coal on the Manitoba market through the "Coal Truth" fuel office in Winnipeg. It is stated that 65% of the coal consumed in Winnipeg this year will be the product of Alberta mines, in spite of almost prohibitive freight rates.

## Bituminous Sands

Most encouraging results have been obtained during the year from investigations carried out on the bituminous sands that are so widely distributed in the McMurray district, especially north and east. These deposits consist of loose sands more or less saturated with bitumen. The content of bitumen varies in different strata, but average material near the outcrop carries 12 to 15%. The bituminous sands are exposed along the Clearwater and Athabaska rivers and tributaries, and are known to extend over several thousand square miles, varying in thickness from a minimum where the beds have been eroded, to a maximum of possibly 300 feet, according to the latest data. The problem of extracting the bitumen from the sand has attracted much attention for the past few years not only in Alberta and other parts of Canada, but in other countries. During the summer of 1922 the first plant was erected at Waterways on the deposit, by Thomas Draper, president of the Draper Machinery Manufacturing Co., and of the McMurray Asphaltum and Oils, Ltd., both of Petrolia, Ont. The plant was completed, and a successful run was made in September. Mr. Draper expressed himself as satisfied that the process used was of commercial value. It is the intention to enlarge the plant early next spring. Much credit is due Mr. Draper for this pioneer undertaking, as it was under adverse conditions and only with the greatest difficulty that he was able to obtain ground and permission to erect this plant from the Federal Government, as the bituminous sand rights had been reserved. Furthermore, this was not a stock selling scheme, and not a dollar was asked for in this Province.

Investigations have been carried out on separation processes by Dr. K. A. Clark in the Industrial Research Department at the University of Alberta. The results to date indicate that Dr. Clark has found a practical method of extracting the bitumen from the bituminous sands. The product obtained from these deposits would be a material suitable and desirable as a surface dressing in rural road construction, and as a pavement in city streets and sidewalks. The provincial government has secured about 100 tons of bituminous sands, and has shipped them to the University. The bitumen extracted from these sands during the winter will be utilized in laying experimental road and pavement next spring. If this experiment is successful, more extended development of these enormous mineral deposits will be assured.

The Alean Oil Company has been carrying on drilling operations on the bituminous sands about forty miles north of McMurray, and five miles from the Athabaska

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river where the sands are exposed. At the close of the field season it was stated by those interested that a semi-fluid product had been encountered in the bituminous sandstone formation.

### *Petroleum*

The endeavour to find commercial quantities of oil in this province has been continued, with signs of increased activity.

The only production of petroleum has come from the Okotoks field or Turner Valley field, 35 miles south-west from Calgary. The production from the Royalite Company's absorption plant and the "topping plant" of the Southern Alberta Refineries, Ltd., will amount to about 10,000 barrels.

Most intense interest has been taken in the petroleum possibilities in the Sweetgrass Coumts district, close to the international boundary line, south-east from Lethbridge, as a result of the producing wells drilled ten miles south of the border in Montana in the Sunburst-Kevin field. The McLean-Mitchell well, three miles east of Coumts, is now 2,560 feet deep, and one good showing of oil has been encountered. Five other rigs have been set up in the same district, but no definite indications have yet been reported. The Imperial Oil Co. are drilling five miles west of Coumts, but have not yet reached the first oil sands. Drilling operations are also being carried on in south-eastern Alberta, north-east of Sweetgrass buttes, at Pakowki lake, and east of Medicine Hat.

In central-eastern Alberta the following companies are drilling.—

Imperial Oil Company at Misty Hills, depth about 3,300 feet; West Regent Oil & Gas Co., at Monitor, dept, 3,250 feet; British Petroleum Co., near Wainright, depth, 1,500 feet; Irma Oil Development Co., at Irma, starting to drill; Talpey Arnold Well at Birch Lake, drilling all summer;

The Imperial Oil Company have just completed the Fabyan well, east of Irma, at a depth of about 2,750 feet. The well is non-productive insofar as oil is concerned, but it has been classed as the greatest gas producer in western Canada. In April a tremendous gas flow, carrying a small quantity of oil, was encountered at 1,870 feet, estimated at 30,000,000 cubic feet per day. With difficulty the gas was shut off and drilling continued. The gas flow when the well was completed in December was reported to be from thirteen to fifteen million cubic feet per day. All these wells are situated on a major structure known as the Irma-Viking-Birch-Lake monocline. Preparations are being made for more extensive drilling operations on various parts of this structure.

South-west from Edmonton a well is being drilled at Pigeon Lake, and the Imperial Oil Company's well at Minehead on the Alberta Coal Branch, west of Edmonton, is down 1,500 feet, but no indications are yet reported.

In the Peace River district, drilling operations have been renewed on three wells. Indications of oil and strong flows of gas have been reported.

On the western boundary of the province, in the Pouce Coupé district operations on the Imperial Oil well have continued in spite of unforeseen difficulties. The well is now down about 2,570 feet and encountered showings of oil at 900 feet, and a tremendous gas flow about 1,600 feet, estimated at 30,000,000 cubic

feet per day. On December 27th an explosion occurred at the well, which injured several men. One other well has been drilled in the district, by the Pouce Coupé Oils, Ltd., to a depth of 1,500 feet before the close of the season.

In the Hay River district, south of Great Slave Lake, drilling was started last summer, but at the close of the summer the oil horizon had not been reached.

It is reported that two wells are being drilled by the Imperial Oil Company at Fort Norman. There were rumors brought out this fall that the Discovery well had a producing capacity of about 75 barrels of oil per day.

At scarcely any time during the year have there been more than twelve to fifteen drills at work. When we consider the enormous territory to be prospected by drilling between the international boundary line and Fort Norman, it is evident that there is room for increased drilling activities.

### *Natural Gas*

Considerable attention has been given to the natural gas problems in Alberta during the year. The Bow Island field, which supplies Calgary, is showing signs of decreased production.

In the Viking field, 70 miles south-east of Edmonton, there are ten gas wells with a capacity of about 32,000,000 cubic feet per day. The City of Edmonton expects to be supplied from this field. Negotiations have been completed for the purchase of this gas at a rate not to exceed 46½ cents per thousand cubic feet for domestic purposes, and 30 cents for industrial plants. It is expected that the installation of the pipe line will be commenced early in the new year.

### *Salt*

The Provincial Government drilled a well on the McMurray townsite, near the junction of the Clearwater and Athabaska rivers, in 1920, and workable beds of salt were encountered about 650 feet below the surface. Since that date the Alberta and Great Waterways railway has been extended by the Provincial Government to the Clearwater river, six miles from McMurray. In October the site for another salt well was chosen close to the railway at Waterways, and drilling commenced. If commercial beds of salt occur at this point, it is the intention of the Government to take steps to have the salt deposits developed.

### *Clay*

With the increased demand for building material, several brick plants were reopened. The Alberta Clay Products Co., and the Medalta Stoneware Limited, of Medicine Hat, were active throughout the year, utilizing clay from south-western Saskatchewan. The latter company has been enlarged and reorganized as the Medalta Potteries, Ltd. This company will manufacture white-ware in addition to the pottery products previously manufactured. A deposit of fireclay has been investigated from the Athabaska valley, 50 miles north of McMurray. Steps are being taken to develop the deposit next summer.

### *Ochre*

Ochre from a small deposit west of Banff is being utilized in the manufacture of paint by the Rocky Mountain Paint Company, recently formed in Calgary.



# Yukon Territory

## PLACER GOLD AND SILVER-LEAD

Mining in the Yukon territory has taken a decided step forward during the past year. Its production is still of course, much below that of the years of the famous Klondyke boom; but the gold dredging and hydraulic mining that succeeded the original placer digging have proceeded steadily, and the Keno Hill silver-lead deposits, which promised so well during 1921, have fulfilled part of that promise and have now, at end of 1922, ore reserves that indicate a useful future.

### *Placer Gold*

For sixteen successive seasons the Yukon Gold Company has continued its dredging and hydraulicking operations on the creeks and gulches round about Dawson. The zenith of its operations has passed; but the gold-bearing gravel still to be worked ensures continuous production for many years to come. One dredge operated on Gold Run creek during the season of 1921, and hydraulic mining in the immediate vicinity of Dawson was continued. The production from each of these operations during the season of 1921 was, in round figures, a quarter of a million dollars, and it is estimated that the season of 1922 will show about the same return.

There were five other dredges in operation during 1922 on the creeks of the Dawson area, among them those of the New North West Corporation and the allied concern, Burnall and Baird, Limited, being the most prominent. These two companies have dredges operating on Dominion Creek and in the valley of the Klondyke River.

These operations, along with a small production from scattered individual placer diggings, bring the total yield of gold for the Yukon district during 1922 to about a million dollars, the grand total to date being 210 million dollars. The dredging operations for the year have been facilitated to a notable degree by the use of water instead of steam in thawing the gravel.

### *Silver-Lead*

The Mayo silver district, north of the Stewart river, and about 150 miles easterly from Dawson, commenced its career of production in 1914, and in four years a single ore-shoot on the Silver King claim produced 2,500 tons of high-grade silver-lead ore containing about 200 oz. per ton which brought \$344,000 at prices then prevailing. In 1920 a new ore-shoot, on Keno-Hill, yielded its initial shipment. During 1921 Keno Hill, Limited, a subsidiary of the Yukon Gold Company, shipped 2,200 tons of high-grade ore, and during the past summer 3,500 tons. The ore carries about 225 ounces a ton in silver, and this gives the year's shipment a value of approximately \$750,000.

During the year a new producer has been developed, which has made a small initial shipment and promises to produce equally with Keno Hill, Limited, during the next season. This is the Treadwell Yukon Company, whose claims are likewise on Keno Hill. A number of shoots of high-grade ore have been opened up on this company's claims sufficiently to ensure a substantial tonnage for hauling over the winter roads during this winter for shipment in the spring.

The old Silver King vein has been explored further during the year, and a small shipment of high-grade ore was made last summer.

Many of the lodes of the district contain ore that has not been left by Nature in the concentrated form that is required for profitable operation. The long haul on sleighs (twenty miles or more) during the winter, the trip by barge to the Pacific and the voyage by steamer to San

Francisco or Tacoma allow of the shipment of only the richest ore. Meantime a large tonnage of milling ore is being blocked out, and the last report of Keno Hill, Limited (April, 1922) forecasted the erection of a mill. It is probable that the low-grade ore disclosed in the veins of the Treadwell Yukon Company will soon warrant a mill, and the Silver King is already known to have a considerable tonnage of milling ore.

There are a number of prospects of merit in and about Keno Hill, a number of which have been vigorously explored during the past season. None of these has as yet reached the shipping stage.

The success at Keno Hill has stimulated prospecting round about, and a number of additional silver-lead localities have been located. As yet none of these have showed ore sufficiently valuable to stand the expense of shipment. Dr. W. E. Cockfield of the Dominion Geological survey examined one such locality, Rambler, Cameron and Stand-to hills, in 1921, and his report was published last summer. The galena disclosed so far carried only about one-third the proportion of silver of the Keno hill ore, and the locality is still more difficult of access.

During the past season a considerable amount of prospecting and of development of prospects was done that has not yet been reported with sufficient accuracy to allow of any close estimate of the results attained. Meantime, it is certain that the silver-lead veins occur over a wide area and there are high hopes among workers in the Yukon about the annual production of silver they will provide eventually.

### BAUXITE IN 1922

The production of bauxite in the United States in 1922 was at least twice as large as in 1921 and may reach a total of not less than 300,000 long tons, according to James M. Hill, of the United States Geological Survey. This quantity is about half of that normally consumed, yet the increase in output is encouraging, for it reflects a larger demand by all the consuming industries, particularly the abrasives industry. The operations in the Arkansas and the eastern fields were larger, though in Arkansas car shortage in the fall limited to some extent the production.

During the first six months of 1922 the imports of bauxite averaged about 1,500 long tons a month, but since June they have been more than 3,000 tons a month. The prices of domestic dried bauxite ranged from \$6 to \$10 a ton, but were lower in the last half of the year. The prices of pulverized and dried bauxite have ranged from \$12 to \$15 a ton, and of calcined from \$20 to \$25 a ton. The effect of a shortage of coal is reflected in an increase in the price of calcined bauxite during the later part of 1922. Under the new tariff the duty on bauxite is \$1 a ton, whereas under the old tariff it was on the free list.

The calcium carbide manufacturing plant at Germiston, in the Rand, South Africa, which was built during the early stages of the war, continues to operate satisfactorily. Its output is 7 tons of carbide per day, or 2,500 tons per annum. The works are being enlarged at present.



# The Mining Districts

BY THE JOURNAL'S CORRESPONDENTS

## NORTHERN ONTARIO

**MINEHARING GOVERNMENT PROSPECTUS.**—Some of the statements in the Ontario Government prospectus in connection with the latest bond issue seem to indicate that officials of the Government should come under the jurisdiction of the Blue Sky law. The prospectus states that the extension of the Temiskaming & Northern Ontario Railway north from Cochrane was sure to open up a mineralized area quite of equal, if not of greater value, than that already opened up. There is, of course, no real ground for this assumption. A certain amount of prospecting has been done north of Cochrane, but, with the exception of some clay deposits, no important discoveries have been reported. The prospectus also states that it is not too much to predict that within the not distant future the gold output of Ontario will surpass even that of the Rand in South Africa. This sort of claim is what one might expect in wild-cat mining promotions, and not in a prospectus issued by the Government in connection with an important bond issue.

**THE DIABASE-KEEWATIN CONTACT AT COBALT.**—Public interest is now confined very largely to the gold fields, and very little is heard of the special work being carried on in the Cobalt camp, which may have an important bearing on its future production. During the past few years, and particularly since Mr. C. W. Knight completed his geological survey of the Cobalt area much attention has been paid to the lower diabase-Keewatin contact. The shaft of the Continental company is down over 650 feet, and should reach the contact at approximately 900 feet, when it is expected that the continuation of the main O'Brien vein will be found. On the Violet property of La Rose, which adjoins the Colonial, a great deal of work has been done on the lower contact, and some very favorable results obtained. The new shaft is being sunk to a depth of approximately 600 feet, and it is expected that the property will be producing again by next May. The Coniagas is developing the Ruby property in the Green-Meehan section, and has sunk a shaft 150 feet deep to explore the conglomerate and slates underlying the diabase. A station is now being cut and lateral work will be started immediately. The Mining Corporation has started the unwatering of the Seneca-Superior property on Peterson Lake. In the early history of the Peterson Lake the property was divided into a number of leases the Seneca-Superior being the most important, with a production of over 5,000,000 ounces. The Peterson Lake was recently taken, under lease, by the Mining Corporation, and there is a considerable area yet to explore. The Nipissing shaft No. 26 will also be explored on the diabase-Keewatin contact. No. 26 vein was worked in the early days of the camp and had a very substantial production, and it is expected that a considerable tonnage of mill rock, at least, will be encountered. The Oxford, Victory and Genessee are also carrying on new work with fair prospects of success. The Coniagas has also taken a lease on the Beaver

property, which has a shaft down to a depth of 1,400 feet, and will explore the lower contact at a depth of approximately 1,200 feet. A short distance below this point a large vein, carrying some silver, was encountered, and it is believed that the geological conditions indicate important possibilities.

In South Lorrain the Keeley property and the Frontier property of the Mining Corporation have developed into very substantial producers and extremely high-grade ore is being mined. In some places widths of 12 to 18 inches of some of the highest grade ore ever found in the district have been met with. It is expected that during the coming summer a great deal of work will be done in South Lorrain as a result of the developments at the Keeley and Frontier.

**KEELEY SILVER RESERVES.**—The recent report of the Huronian Belt Company, which has a large interest in the Keeley, states that at October 31st last, reserves at the Keeley were 1,153,300 ounces, and 324,000 lbs. of Cobalt. A new company, known as the Keeley Silver Mines Limited, has been formed, with an Ontario charter, and a capitalization of 2,000,000 shares of \$1.00 par, of which 1,343,300 will be issued. Mr. Hamilton B. Wills is President. 1922 production from the Keeley, during the first 11 months, was 687,500 ounces. It still maintains a high rate of production, and information available bears out the assumption that the company will produce approximately 1,000,000 ounces during the year 1923. During the month of November production amounted to 84,742 ounces, notwithstanding that breakages in the mill necessitated a shut down for 10 days. A new vein has been found which shows 7 inches of 1,100-ounce ore, and on the 6th level the "N" shoot on the Woods vein has been opened up for 130 feet, and averages 370 ounces over a width of 19 inches. On the 7th level the same ore shoot has been drifted on for 85 feet, where it shows 360 ounces over 18 inches. The Mining Corporation has also opened up an ore shoot, extremely rich, on this same vein, not far from the Keeley boundary.

**COBALT.**—During the year ending October 31st last, the Coniagas produced 1,158,900 ounces, which is a decrease of approximately 150,000 ounces compared with the previous year. The grade of the ore was 9.19 ounces per ton, compared with 10.7 ounces per ton in the preceding year. The cost of mining and concentrating was 32.6 cents per ounce, and the average price received for silver was 70.8 cents. Profits amounted to \$369,000, and \$200,000 was paid in dividends. During the year the company spent \$54,000 examining properties, which includes \$18,000 spent in diamond drilling the Newray. At the present time options are held on properties in Coleman, Tisdade & Buckle Townships, the option on the claims in McVittie having been allowed to lapse. The Coniagas has also taken a lease on the Beaver, Prince, Davis and Badger properties. It is understood that work at the Beaver will be started as soon as a pre-heater for air is obtained for the hoist.

October production of the Mining Corporation was 124,811 ounces from 5,527 tons of ore, as compared with



production of 173,000 ounces in September. During October, however, operations were suspended for 11½ days, on account of the fire. A large part of the production is now being obtained from South Lorrain and the company has started to haul ore with its tractor.

The Nipissing Extension Mines Company, which owns the old Farrah property, now under lease to the Mining Corporation, is apparently attempting the methods of some of the recent wild-cat flotations, and is offering what are called "subscription rights." As is usual with this class of promotion, facts are misstated and prospective investors are lead to believe that the Mining Corporation is developing valuable ore, and that a substantial production is assured. The Mining Corporation has informed the newspapers that these statements were made without their knowledge or authority and that the company is not interested in any way in the sale of these "subscription rights." It is understood that there is a small surface showing of silver on the property, but that the underground work done by the Corporation has not yet succeeded in finding any ore. The company has a lease on the property for five years, on a royalty basis of 15 per cent. on the net smelter returns. During the life of the lease the company has to spend \$1,000 a month.

**PORCUPINE.**—The power situation in Porcupine is still unsettled, but officials of the Northern Canada Power Company announce that 4,000 additional h.p. will be available from the Sandy Falls plant before the end of January. This will be distributed among the McIntyre, Dome and Hollinger, and it is not believed that there will be any power immediately available for other properties. In the meantime the Rochester is installing a fuel burning plant, and the West Dome Lake and the Clifton are operating on steam.

The West Dome Lake will be unwatered in the near future, and underground operations will be started immediately.

Clifton officials advise the shareholders that the inability to secure electric power is a very severe handicap. The steam plant is of small capacity and the new mill is being operated in only a small way, and is used very largely as a means of sampling veins over stopping widths. It is also stated that the pool existing in the stock will end December 31st, and shareholders are advised against any hasty attempt to sell.

The Dome Mines will ask for a Dominion Charter to permit carrying out the re-organization plan whereby 4 shares of no par value will be given for each share in the present company. Developments at the mine continue to be satisfactory and production is being maintained at approximately \$350,000 a month.

The McIntyre is treating close to 800 tons a day and the average grade of the ore is approximately \$11.00 per ton. Developments at the property continue to be very satisfactory, and it is expected that the output in the near future will exceed that of the Dome.

Preparations are now under way to start clearing a right-of-way for the transmission line from the plant of the Great Northern Power Company at Matachewan to Night Hawk Lake and Porcupine districts, and one hundred men will be engaged for this purpose. The Ontario Government has a force of men engaged in building a road from Elk Lake to Indian Chutes and

Matachewan, over which it is expected a great deal of mining machinery will be hauled this winter. As soon as hydro-electric power is available, it is understood that work will be started in Matchewan on some of the properties that have been closed down for some time. The Matchewan Gold Mines, which has a substantial amount of ore running in the neighborhood of \$11.00 per ton, will undertake a considerable amount of underground development in order to get ready for a mill.

**KIRKLAND.**—The Lake Shore is making preparations for extensive additions to the plant and mill. New buildings are being put up and a new compressor has been installed and a new hoist ordered. It has also been decided to install a 75-foot steel head-frame and a crushing plant at the shaft. The crushing will follow the lines of the Hollinger and will consist of crushers and rolls, and will have a capacity of over 500 tons a day. Additions will be made to the precipitation end of the mill, which will permit the precipitating of \$6,000 per day. Assuming the ore to average \$20.00, this would mean mill capacity of approximately 300 tons a day.

It is understood that the December production of the Teck Hughes was over \$100,000. It has apparently been decided to run low-grade and high-grade ore through the mill on alternate months, as it is found that the high-grade ore takes a very much longer treatment.

The Continental has started sinking on the Post claims, which it has under option. An electrically driven mining plant will be installed, and surveys are now being made for the transmission line. The company recently reported that it had uncovered on the surface a vein for a length of 100 feet, which averaged \$8.00 over a width of 5 feet. A shaft has been commenced on this vein.

The Montreal-Ontario, in an official statement, advises that a porphyry dyke, averaging \$10.00 has been cut, and that recent developments underground have given encouraging indications.

The Lebel Lode is making preparations to install a mining plant. A general meeting of the shareholders has been called to ratify a by-law authorizing the directors to sell 1,000,000 shares of treasury stock at a discount.

The Crystal Lake Gold Mines will install a mining plant this year and if financial arrangements permit will sink a shaft to a dept of 500 feet.

It is understood that the newly formed Swastika Gold Mines plans to do a considerable amount of diamond drilling on its properties in the Kirkland district.

Better results are now being obtained at the Kirkland Lake Proprietary mill, which is treating ore from the Tough-Oakes and Burnside properties. During the month of November \$24,000 was recovered from 2,000 tons, which is the best grade for some years. The capacity of the mill is about 120 tons a day, and an endeavor will be made to increase the tonnage. The company made a profit during November on the higher grade ore, as a result of recent developments on the Burnside properties.

The Lake Shore output for November was \$32,746, from 1912 tons, or an average of \$17.10 a ton, which is the highest production of any month since last July. With the enlargement of the shaft completed, mining operations are back to normal, and work is being car-



work on at several different faces. Preparations are being made to sink the shaft to 800 feet, work on which will be started immediately.

Monthly outputs from the Teck Hughes have shown a great variation during the last few months. In September the production amounted to \$118,000, which is a record in the history of the company. The property was shut down in October, through shortage of power due to the fire, and in November production dropped to \$40,000. It is understood that the December output will be high as compared with that of November.

**SILVER TAIL.**—It is reported that on the Herriek property, in West Shining Tree, which is under option to the Tonopah Mining Company, the crosscut at the 300-foot level has encountered 14 feet of ore, which shows visible gold.

**NEWFOUNDLAND.**—Two companies have already been formed to take over claims on Big Brook, near Stag Harbor on the Labrador coast, where placer gold is reported to have been found last fall. The Labrador Gold Fields Limited has been formed, with a capital of \$50,000, to take over 80 claims. It is expected that the capital will be subsequently increased. It is the intention of this company to divide the ground up into small parcels and lease, as it is believed that the ground is rich enough to permit of the old fashioned methods of cradle and rocker. In St. Johns, Newfoundland, the Stag Gold Mines Limited has been formed with a capital of \$5,000,000, and this company will also control a large number of claims. Stag Harbor is about 630 miles from St. Johns, Newfoundland, and the reported discoveries are on Big Brook, about 25 miles inland. So far, very little is known of the district, and it is too early to express an opinion of its possibilities.

## BRITISH COLUMBIA

**THE ENGINEER SHOWING.**—Reports persist that the Engineer Mine, Atlin, is to be acquired by eastern mining investors. If this British Columbia property is taken hold of and seriously developed it may possibly fulfil the promise of its bonanza outcrop. If it should develop into a genuine producer it will constitute another important advance in the development of the mineralized zone known as the "eastern contact belt," which extends northerly from a point below Alice Arm, through the Salmon River valley, to a point north of the Engineer. A ready within this territory there are four well known mines, viz., the Dolly Varden, the Hidden Creek Mine (Granby Consolidated Mining & Smelting Co.), the Premier and the Engineer. Of the last it is interesting to quote the Minister of Mines Report for the year 1918: "Altogether it is a wonderful showing of gold and there is every reason to believe that it can be developed into one of the greatest gold producers of the continent. Development consists of a number of open cuts, and in the neighborhood of 1,000 feet of underground work, exposing some 25 veins varying in width from a few inches to 4 feet, the majority showing visible gold. All this underground work has been in ore. A ball mill was erected on the property by the late Captain Alexander. The record run of this mill was 24 lbs. 8 ozs. (Troy) of gold from 160 pounds of ore."

**DRUM LUMMON.**—A considerable amount of work has been done in recent months on the Drum Lummon Mine,

Douglas Channel. A shaft is being sunk to develop the ore-body at 100 feet below the main level and a new ore-body has been proved up east of the present cross-cut tunnel. An assay return from the same is given as follows: Gold, 0.01 oz.; silver 7.5 oz.; copper, 19.5 per cent. A dock has been built at tidewater and new machinery is being installed. A semi-Deisel engine will supply motive power and compressed air will be supplied by a Laidlaw compressor of 500 cu. ft. capacity. It is reported that a campaign of diamond drilling will be started as soon as conditions permit. Glenville Collins, engineer in charge, expects to be able to make some shipment to the Granby Smelter shortly.

**DOLLY VARDEN.**—The Dolly Varden Mine, Alice Arm, is to be taken over by George Wingfield, of Nevada, who advanced \$182,322 in 1921 to the Taylor Engineering Co. on the security of their holdings at Alice Arm. These financial obligations have not been discharged and Mr. Wingfield is taking the necessary steps to secure control. What his plans are as to the property, has not been announced, but it is hoped that the new owner will develop the mine and operate the eighteen miles of railway from tidewater to the workings on the Kitsault River. The railway serves, besides the Dolly Varden Mine, a number of gold prospects so that prospectors and miners of the district are keenly interested in the matter. It has been suggested that Mr. Wingfield might seek to dispose of the entire property, which includes modern mining machinery at the mine, a short tramline and bunkers at the railhead, the railway referred to, and bunkers at the beach. The railroad cost roughly \$1,000,000 to build. It was completed in 1920 and operated that season, bringing a considerable quantity of high-grade ore from the Dolly Varden to Alice Arm. Since then it has been idle. Mining men, however, believe that prudent development will put the mine in shape for shipping and that the Wolf group of claims, which are adjacent, are of sufficient promise to merit more attention.

**TRAIL SMELTER RECEIPTS.**—The Trail Smelter, Canadian Consolidated Mining & Smelting Co., received 4,923 tons of ore during the week ending December 14th last, of which 4,657 tons came from the company mines. In addition there was a shipment of 170 tons from the Silversmith, Sandon, and one of 52 tons from the Surprise, Republic. For the week ending December 24th ore receipts totalled 7,631 tons. Among the independent shippers were the Alamo Alamo, 90 tons; Black Rock, Northport Wn., 125; Galena Farm, 12; Knob Hill, Republic, 103; Northport Smelter, 346; Paradise, Windermere, 42; Quilp, Republic, 52; Ruth, Sandon, 34; Silversmith, Sandon, 122; while the company mines contributed 6,653.

**DISPUTED CLAIMS.**—A writ has been issued on behalf of the Silver Ores Inc. against the Premier Gold Mining Company of British Columbia, the purpose of which is to "recover title to certain Salmon River mineral claims known as the Premier Extension Nos. 1, 2, 3 and 4, the Extension Fraction, the True Blue, and the Gloria Fraction." Counsel further explains that "it will be alleged that Captain Fader, then president of Silver Ores Inc. purchased these claims with the funds of the Silver Ores, took the deeds in its own name and fraudulently sold them to the Premier Gold Mining Co., whose property immediately adjoins the Premier Mine."



R. F. Ainslie, of Syracuse, N. Y., is reported to have bonded the Galena Farm Mine at Silverton, on which property development has been resumed.

**BRITANNIA.**—Latest information from Britannia Beach is that the Britannia Mining & Smelting Company expects to be in a position to start shipping in February. Mill construction and machinery installation now are well advanced and the Victoria Mine, recently opened, is in condition to commence feeding the mill as soon as it is ready. About 750 men now are employed in the mine and at the works. With the resumption of active productive mining operations there will be about 1,000 men continuously on the pay roll.

**COAL MINERS' CERTIFICATES.**—Twenty candidates sat for examinations conducted recently at Nanaimo, Fernie, Merritt, and Cumberland by the Board of Examiners, appointment under the "Coal Mines Regulation Act." They wrote for first, second and third class certificates, although the majority took the papers of the last two classes. Of the twenty who offered, ten were successful and the Board, in its report, observes that "most of the candidates for Second Class, and a few of those for Third Class certificates, possessed a knowledge of mining matters and gave proof of a general education considerably above those usually manifested by aspirants for these certificates."

A list of those successful follows:

Second Class: Robert Kelly Smart, Nanaimo; Daniel Walter Thomas, Cumberland; William Archibald, Merritt; Frank Yates, Michel.

Third Class: James Bainbridge, Nanaimo; Thomas Claud Vincent, Coalmont; George Carroll, Nanaimo; William Weaver, Michel; Robert Winstanely, Michel; James Phillips, Nanaimo.

**ASSAYERS' CERTIFICATES.**—An Assayer's examination of candidates for Certificates of Efficiency under the "Bureau of Mines Act" was held last week; William Fleet Robertson, the Provincial Mineralogist being the Chief of the Board of Examiners. There were three candidates and all were successful as follows: G. W. Cotton, Kurt Raht, L. H. Wenerstrom.

It is a matter of comment that Messrs. Cotton and Raht of the Trail Smelter both obtained 91 per cent of the possible marks, a record only once exceeded since the establishment of examinations in this Province.

### CARIBOO, B. C.

Though the gold production of the Barkerville district during the season of 1922 was disappointing, due to the dry season, an important amount of exploratory work was done, which provide bright prospects for 1923.

Keystone drilling has disclosed payable placer ground on Swift Creek, under lease to Detroit investors represented by Messrs. Kerr and Dunlop, and it is intended to install a dredge shortly. Drilling has also established paying dredging values in the old bed of Williams Creek, Grouse Creek and Antler Creek, which await capital for development.

During 1922 some promising discoveries were made by individual prospectors. Leopold Muller ran a 600-foot tunnel on Dragon Creek, where he disclosed good values on bed-rock, the gold being coarse and about 900 fine. This ground is capable of being hydraulicked.

Houser brothers struck some very good pay in the Devil's Canyon, where they operated a small hydraulic

plant. John MacDougall has a gang of men drifting on Jack o'Clubs Creek, where the present values average \$4.02 per 10-foot cap. F. J. Tregillas, Jos. House and F. Reed are preparing to open up their property on Cunningham Creek, where they expect to have a successful season next year, all the factors for cheap hydraulic mining being favorable.

The strike at Cedar Creek has stimulated prospecting on the higher benches, and it is expected that this will continue during the coming season.

The work last summer of Dr. W. L. Uglow for the Geological Survey at Ottawa has drawn attention to the quartz showings of the district. On Proserpine Mountain some rich ore has already been found. Mr. Cleaves, representing eastern capital, has a few men working on quartz showings on Lowhie Mountain and at Red Gulch on Mosquito Creek. At the former place he is driving a tunnel to intersect a vein on the Rainbow claims, where Mr. Sanders found some spectacular ore last summer. Mr. Ernest Moore found several promising quartz veins last season on upper Cunningham Creek, and Mr. Wells, of Seattle, is preparing to explore them systematically next spring.

Practical researches into the use of drills and drill steel in the Rand mines recently have already resulted in economies. Steel is now more uniformly gauged and tempered and the drills are inspected and overhauled systematically.

It is proposed to install at the Modder Deep on the Rand, a flotation plant to separate pyritic material from the sand before leaching. Experiments indicate that the separate treatment of this pyritic material will prove to be profitable.

There are now a large number of trade associations in the United States at work on co-operative industrial research. *Industrial and Engineering Chemistry* gives a partial list of these showing 42 trade associations.

Advertisements other than "Employment Wanted" or "Employees Wanted" will be inserted in this department at the rate of 20 cents per agate line (14 agate lines make one inch) \$2.80 per inch, each insertion, payable in advance. Space measured from rule to rule. When four or more consecutive insertions of the same advertisement are ordered a discount of 25 per cent. will be allowed.

Advertisements of "Wanted Employment" or "Wanted Employees" will be inserted at the rate of two cents a word, net. Cash must accompany order. If box number is used, enclose ten cents extra for postage in forwarding replies. Minimum charge 50 cents.

**WANTED**—Safety Engineer for Canadian Gold Mine. Applicant must have had previous experience in the work. Diplomacy in dealing with staff absolutely essential. Salary \$250. per month to suitable man. Box 545 Canadian Mining Journal, Gardenvale, Que.



## ANNOUNCEMENT

### CHANGE OF CORPORATE TITLE

SINCE MR. HAMILTON B. WILLS HAS NOT BEEN ACTIVELY CONNECTED WITH THE AFFAIRS OF HAMILTON B. WILLS & CO., LIMITED, SINCE JULY, 1920, AND HAS HAD NO CONNECTION WHATEVER FOR OVER A YEAR, IT HAS BEEN DEEMED ADVISABLE TO CHANGE THE NAME OF THE COMPANY TO REFLECT THE MANAGEMENT SELECTED BY MR. WILLS TO SUCCEED HIMSELF.

THE CHANGE OF NAME IS A FORMALITY AND DOES NOT AFFECT THE AFFAIRS OF THE COMPANY IN ANY WAY, SHAPE OR MANNER.

**ARTHUR E. MOYSEY & CO., LIMITED**  
FORMERLY KNOWN AS  
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Addresses of advertisers whose names appear in the following classified index, may be found upon reference to their advertisements. An alphabetical index to advertisers will be found on the page facing the inside back cover. The following regulations apply to all advertisers:—One-eighth page, every issue, three headings; one-quarter page, every issue, six headings; one half page, every issue, six headings; one half page, every issue, twelve headings; full page, every issue, twenty-four headings. Buyers who are unable to find in the classification heregiven such machine or supplies as they desire are invited to write Service Dept., Canadian Mining Journal, Gardenvale, Que., who can in all probability, refer them to proper sources.

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- The Value of Peat Fuel for the Generation of Steam, by J. Blizard, B. Sc.
- Analyses of Canadian Fuels. Parts I to V, by E. Stansfield M. Sc., and J. H. H. Nicolls, M. Sc.
- Graphite by H. S. Spence.
- Gas Producer Trials with Alberta Coals, by J. Blizard and E. S. Malloch.
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- Map 1752. Monitor, Alberta and Saskatchewan. Topography.
- Map 1754. Upper Elk and Highwood rivers, British Columbia and Alberta. Topography.
- Map 1829. Salmon River area, Portland Canal mining division, B. C. Geology.
- Map 1831. Vegreville; townships 47 to 55, ranges 11 to 10 west of the 4th meridian, Alberta. Topography.
- Map 1835. Beauceville, Beauce county, Quebec. Geology.
- Map 1836. Explored routes in a belt traversed by the Canadian National Railways between Longlac and Nipigon Ontario. Geology.
- Map 1860. Keno Hill area, Mayo district, Yukon. Geology.
- Map 1882. Bridge River, B. C. Geology.
- Map 1901. Upper Kitzault valley, B. C. Geology.
- Map 1948. Wanapitei Lake area, Ont. Geology.
- Applicants for publications not listed above should mention the precise area concerning which information desired.
- The Geological Survey will, under certain limitations, give information and advice upon subjects relating to general and economic geology. Mineral and rock specimens, when accompanied by definite statements of localities, will be examined and their nature reported upon.
- Communications should be addressed to **The Director, Geological Survey, Ottawa.**

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# Ontario's



# Minerals

PROVINCE OF ONTARIO

DEPARTMENT OF MINES

HON H. MILLS, Minister of Mines

## Mineral Areas.

Ontario, with its 407,262 square miles, contains many millions of acres in which the geological formations are favorable for the occurrence of minerals, 70 per cent of the area being underlain by rocks of pre-Cambrian age. The phenomenally rich silver mines of Cobalt occur in these rocks; so also do the far-famed nickel-copper deposits of Sudbury, the gold of Porcupine and Kirkland Lake, and the iron ore of Magpie and Moose Mountain mines.

## Economic Minerals.

In addition to the above, practically all economic minerals (coal and tin excepted) are found in Ontario:—actinolite, apatite, arsenic, asbestos, cobalt, corundum, feldspar, fluor-spar, graphite, gypsum, iron pyrites, lead, mica, molybdenite, natural gas, palladium, petroleum, platinum, quartz, salt, tale and zinc. This Province has the largest deposits on the continent of tale, feldspar, mica and graphite.

Building materials, such as ornamental marble, limestone, sandstone, granite, trap, sand and gravel, lime, portland cement, brick and tile, meet every demand.

## Mineral Production.

Preliminary returns show the output of the mines and metallurgical works of the Province for the year 1921 to be worth \$48,128,387, of which the metallic production was \$27,574,202.

The following figures show the rapid growth of Ontario's mineral industry by five-year periods since 1891:

| Year.         | Value.      | Year.         | Value.       |
|---------------|-------------|---------------|--------------|
| 1891 .. . . . | \$4,705,672 | 1906 .. . . . | \$22,388,383 |
| 1896 .. . . . | 5,235,003   | 1911 .. . . . | 41,976,797   |
| 1901 .. . . . | 11,831,086  | 1916 .. . . . | 65,303,822   |

## Dividends.

Dividends and bonuses paid to the end of 1921 amounted to \$23,140,734 for gold mining companies, and \$84,388,185 for silver mining companies or a total of \$107,528,919.

## Mining Regulations.

A miner's license costs \$5.00 per annum, and entitles the holder to stake out in any or every mining division three claims of 40 acres each. After performing 200 days' assessment work on a claim, patent may be obtained from the Crown on payment of \$2.50 or \$3.00 per acre, depending on location in unsurveyed or surveyed territory.

## Assay Office.

The Provincial Assay Office at No. 5 Queen's Park, Toronto, is maintained by the Department of Mines for the free identification of minerals, free assays under the provisions of the Mining Act of Ontario, and also for general assay work as per the Schedule of Charges which may be obtained on application.

## Temiskaming Testing Laboratories

The Department maintains, at Cobalt, an ore sampling and testing laboratory which is now prepared to receive parcels of gold ore from 100 pounds upward, and after sampling and assaying the same to pay to the shipper the value thereof, less treatment charges. The purpose is to afford a market for ores extracted by prospectors and others in developing their mining claims, enabling them to obtain funds which they can use for further work and to report on the most satisfactory method of treatment. Fuller information may be obtained on application to the Manager, Temiskaming Testing Laboratories, Cobalt, Ontario.

## Publications.

For list of publications, illustrated reports, geological maps and mining laws, apply to

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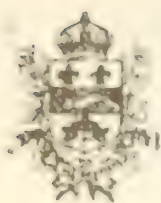
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The holder of the certificate may stake mining claims to the extent of 200 acres.

**WORKING CONDITIONS.** During the first six months following the staking of the claim, work on it must be performed to the extent of at least twenty-five days of eight hours.

**SIX MONTHS AFTER STAKING.** At the expiration of six months from the date of the staking, the prospector, to retain his claim, must take out a mining license.

**MINING LICENSE.** The mining license may cover 40 to 200 acres in unsurveyed territory. The price of this license is Fifty Cents an acre per year, and a fee of \$10.00 on issue. It is valid for one year and is renewable on the same terms, on producing an affidavit that during the year work has been performed to the extent of at least twenty-five days' labour on each forty acres.

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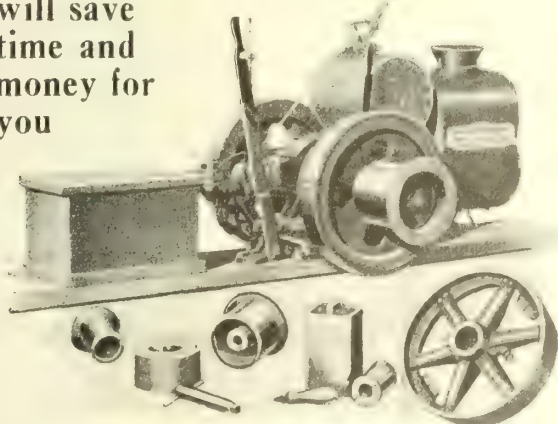
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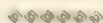
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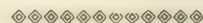
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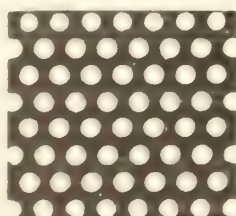
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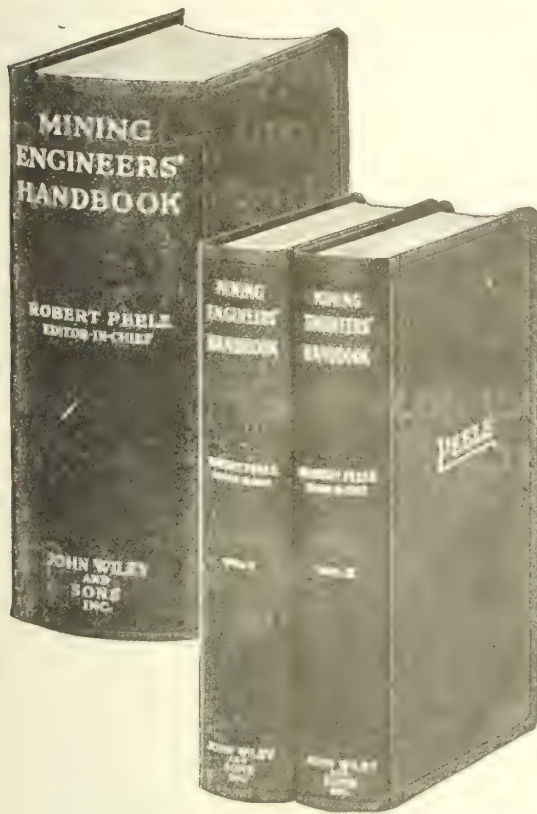
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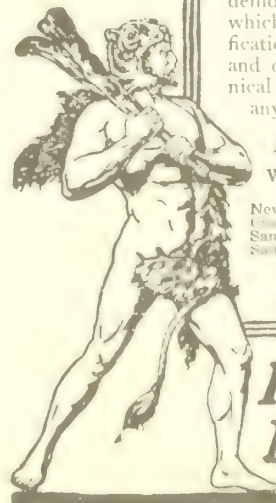
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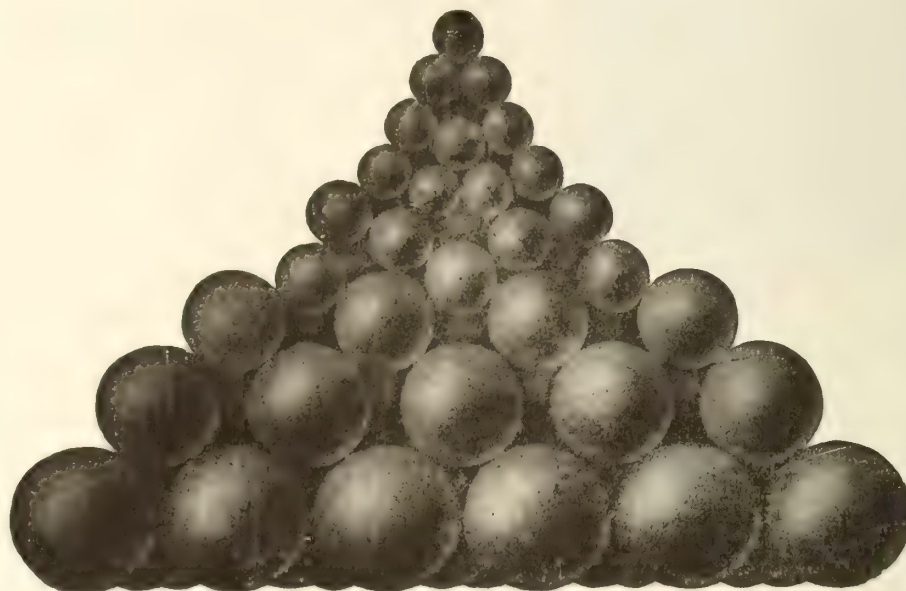
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VOL XLIV

GARDENVALE, QUE., January 19th, 1923

No. 3

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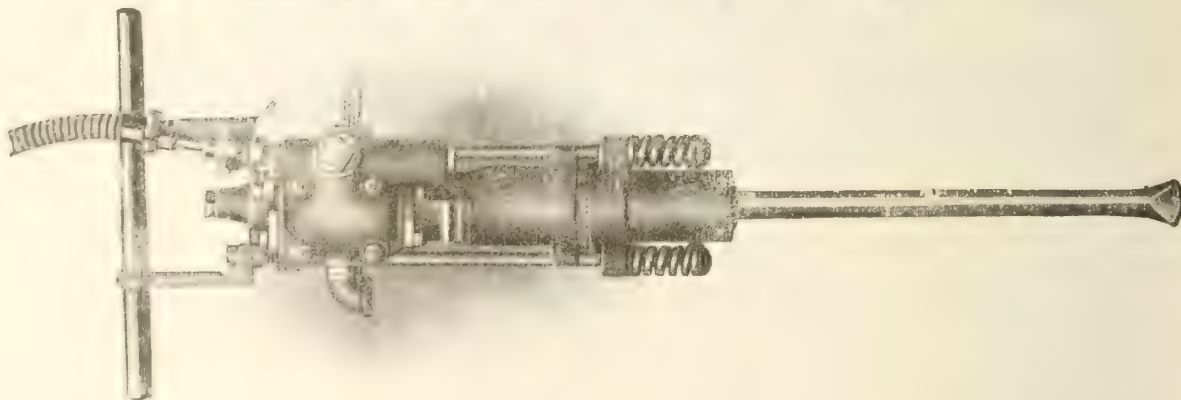
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## -:- EDITORIAL -:-

*Your operations and influence cover the whole of this wide Dominion, ... representing in a very comprehensive, in the most far-reaching manner, the interests of the country at large. — Lord Aberdeen (to the Federated Canadian Mining Institute) — 1897.*

### AN INSTITUTE FOR TECHNICAL EMPLOYEES

Seven weeks from now the Annual Meeting of the Canadian Institute of Mining and Metallurgy will be in session in Montreal. A technical program of first-rate interest has been prepared, and a number of questions of prime importance will be discussed. It is well that important points should be brought to the notice of the Institute's members beforehand in order that the discussion at the meeting may be fully beneficial and a snap judgment on important points avoided. The *Monthly Bulletin* of the Institute and the *Canadian Mining Journal* are the principal agencies to this end.

Last week we pointed out a very serious danger to which the Institute has been subjected by action of Council — a danger that will strike at the heart of the Institute's independence unless prompt action is taken to avert it. Today we wish to discuss briefly a matter that has already been put before all the members, though the lack of general discussion of the point, apart from those primarily responsible for the move, tends to show that few realize its import.

A circular, dated November 30th, has been sent to all members notifying them of a motion to amend section 58 of the by-laws thus:

1. Members shall not be less than twenty-seven years of age and shall have been for at least five years in responsible positions with regard to practical mining and metallurgical work; or shall be such other persons as shall be otherwise eligible in the opinion of the Council by reason of their scientific attainments or technical knowledge; or shall be enrolled already in the Professional Membership class, or Membership class of the Institute at the time that this Amendment comes into force.

2. Associates shall be persons engaged in practical mining and metallurgical pursuits and shall have been so engaged for a period of three years at least, and such other persons as the Council may decide to be eligible through connection with mining affairs; or shall be enrolled already in the Associate Membership Class of the Institute at the time that this Amendment comes into force. Associate members shall be entitled to vote, but may not hold office.

3. Students shall be persons not under eighteen years of age and not over twenty-five years of age, who intend to adopt the profession of a mining or metallurgical engineer; or, shall be already a student member of the Institute at the time this Amendment comes into force.

The import of this motion is virtually that memberships in the Institute shall be confined to technically trained engineers, metallurgists and geologists and those whose practical experience has given them a

similar qualification. It would exclude all others, whatever their interests in the Institute or in the mining industry — these latter being represented at present by almost half the total membership.

This policy of an Institute that is practically a closed corporation, open only to the technical employees of the mining industry, has been openly and vigorously advocated for some time past by a number of the members, particularly those from British Columbia. There is a real need for a closed technical organization, and as we have pointed out in these columns, that exclusively technical membership already exists in the Professional Members of the Institute, though the active organization is still lacking. We believe that by supplying life and activity to this inert corpus, all the principal objects of the movers of this amendment can be accomplished.

The spirit of this amendment is, we believe, in direct opposition to the spirit of the men who founded the Institute twenty-five years ago — a spirit that we are confident still animates a large majority of the Institute's members, professional and otherwise. The spirit of service to the industry is vastly superior to the spirit of service to a limited class of employees of the industry, however pure may be the motives of these employees and however solicitous their care for the industry's welfare. It is well to remember that the mining industry has got along before this, and could exist again, without the aid of technically trained engineers, whereas these engineers are wholly dependent upon the industry for their technical existence. A purely technical Institute might conceivably be of great benefit to the industry; but selfish human nature being what it is, we much prefer to see the industry guided and watched over by an Institute more nearly representative of all its interests.

We must not be frightened by our Secretary's cry for an "open door" to membership. Mr. Mackenzie knows well that a good argument is the best means to create a live interest in Institute affairs. He intends no more than the rest of us to flood the Institute with undesirables. The fact is that at present there is nothing in the by-laws, nor has there ever been, to exclude the "mob"; yet the "mob" has not been admitted, nor will it be so long as the Institute preserves its present high ideals of independence and of service to the mining industry.



## LABRADOR

On two occasions during recent months the *Canadian Mining Journal* has published articles dealing with the possibility of mineral development in Labrador, with a view to stimulating interest in that little-known part of our continent. Dr. Kindle's brief account of his journeyings there during the summer of 1921 on behalf of the Geological Survey and the Department of Justice is full of hope for the future mineral production of that unexplored land — as large as *Alaska* and less known to us than any other part of the continent. Mr. William Agar's trip along the coast with Dr. Grenfell during the same summer gave him an opportunity to study the rocks in numerous places, and his impression, too, is to the effect that the rocks and their geological associations offer great promise to the prospector.

Dr. Kindle mentions gold thus: "Placer gold of commercial value may never be found in Labrador, but if it should be found in the sand and gravel terraces which run inland for hundreds of miles along the lakes and rivers west of Hamilton Inlet, the water supply furnished by hanging valleys would afford numerous opportunities for hydraulicking on a mammoth scale." Unfortunately, these same hanging valleys are an evidence of recent glaciation, and it is this glaciation that has scoured the placer deposits from off the major part of Canada. However, Mr. Agar gives us some hope for the existence of placers when he reports that the higher levels of northern Labrador are unglaciated, having remained above the sea of ice that covered the lower levels. Likewise there is always the possibility of the glaciers having over-ridden small areas, possibly gold-bearing, when they swept bare the surrounding hills and valleys.

The public have been invited recently to put their money into a venture for placer mining in Labrador. It is quite possible that there may be payable placers in Labrador, and in the locality specified. The terms in which the alleged placer deposit is described are, however, so ridiculous that they demonstrate quite conclusively that the writer of the advertisement either does not know what he is writing about, or that if he does, he has intent to deceive the reader. Even granted that the incidents relative to the discovery of gold and the assay values are exactly as described, the deductions from these data are absurd. From the ridiculous nature of the deductions, we would judge that the statements of alleged fact should be subjected to very close scrutiny before acceptance. If there were associated with the enterprise experienced mining men, or if there were evidence that a reputable and qualified mining man had been consulted while this *venture* has been formulated, we would be much better satisfied of the "bona fides" of the promoters.

We hope sincerely that a genuine discovery of placer

gold in paying quantities will be made in Labrador. The land is relatively easy of access, and the profits from placer diggings would thus be large. No other mineral discovery would attract men and capital so quickly or so surely; nothing else would give so strong an impetus to the exploration of that vast and desolate "land that God gave to Cain."

## BANKERS AND MINERS

A pronouncement of first-rate importance to the mining industry is that made by Sir Edmund Walker recently in his address to the share-holders of the Canadian Bank of Commerce at the annual meeting. This is one of the few instances within recent years where a Canadian in a position of the highest financial responsibility has been able to gauge Canada's mining industry at its true value, and has dared to express his conclusion in unequivocal terms. Few bankers realize, even now, that mining in this country is now an industry, directed and controlled, in the main, by well-qualified engineers and responsible executives. Few Canadians have a clear vision, such as that now exemplified by Sir Edmund Walker, of the place mining is destined to take in Canada's economic organization.

It was expressly with the object of stimulating thought in the minds of men of wide experience and capable of independent and well-founded judgment that Dr. Corless made his startling pronouncement before the Canadian Institute of Mining and Metallurgy now almost a year ago. Sir Edmund Walker has been the first, outside the mining profession, to respond publicly. His position of leadership in financial circles in this country will ensure that others will follow him in exploring the possibilities of the mining industry. We of the mining profession must make sure that wise guidance is provided for these strangers during their initial excursions into the mining field, if we are to reap the full benefit of their co-operation.

## A PRACTICAL SUGGESTION

When the personnel of the Hon. Harry Mills' Iron Ore Committee was announced some months ago, it was at once obvious that its function was to examine in a general way the conditions surrounding the possible production of iron ore in Ontario, and to advise a suitable course of action. As none of the members of this committee have, heretofore, studied the iron ore business in a comprehensive and thorough way, their conclusions must, of necessity, rest upon evidence adduced by, and ideas provided by, men who have made iron ore a special study and whose record shows a capacity for sound judgment and shrewd conjecture.

Messrs. A. Hasselbring and G. W. McLeod have written the article we print today with the express object of creating discussion along the line that they consider will be most fruitful of practical result. Mr.

Hasselbring is one of the very few mining engineers in Canada who can speak with authority and from personal experience about iron ore mining in this country. He has mined a large part of the iron ore produced in Ontario, and was instrumental in developing to the point of technical success the beneficiation process that has come closest to commercial success—that at Magpie Mine.

We recommend for the closest attention of any interested in a Canadian iron ore industry the suggestions made by Messrs. Hasselbring and McLeod.

### EDITORIAL NOTES

We are pleased to welcome back to our pages today Mr. Alexander Gray. Mr. Gray was seriously ill during December last, but is now, happily, well on the road to recovery. We have had numerous inquiries from readers who have missed his searching comments and pithy news items during the last six weeks.

Tear off the front cover of today's *Journal* and post it on your notice-board or in the dry or shaft-house. If you wish to have extra copies, a request to the editor will bring them.

Lately there have been a number of wild-cat mine promotions "wished on" honest prospectors and operators by promoters whose zeal has outstripped their discretion and sense of common honesty. Today we print a letter from a prospector, Mr. Robert Holding, in which he publicly disavours any connection with "Holding Consolidated Company, Limited," who have used his name without his consent and of whose stock-selling methods he emphatically disapproves. Public statement of facts such as these might do much to alleviate the stock-jobbing evil.

It is an unquestionable fact that mining men in general are "dead set" against fraudulent mining schemes. More often than not, however, this conviction begins and ends with a pious expression of personal opinion. It is encouraging, therefore, to find the commencement of an organized effort among mining men to expose and suppress fake schemes. The members of the National Shale Oil Conference, at the American Mining Congress in Cleveland last October, passed the following resolution: "That every member...be urged to use his every effort, individually and collectively, to prevent the promotion of fake oil schemes..." Practical means designed to be effective, were adopted to put this resolution into effect. Members of the Canadian Institute of Mining and Metallurgy — take notice, please!

If there remain in Canada any persons capable of thought and deduction who still hold to insular ideas and who still are ready to deny the fact of the world's commercial unity in these modern times, the events

of the last few days must have gone far to convert their views. The virtual cessation of mining in the iron ore mines of the British Empire Steel Corporation at Wabana, Newfoundland, consequent upon the military occupation of that part of Germany to which this ore has been shipped in such large quantities recently, will bring home to Newfoundlanders, if not to Canadians, in a very personal way their interest in events in Europe. The increase, on the other hand, of British coal exports consequent upon Germany's necessity for finding an alternative source of supply, will give to the British people a decidedly heightened interest in the preservation of Germany as a political entity and her speedy commercial rehabilitation.

### HISTORY

I

When men first started mining.  
One prehistoric day,  
No doubt there was repining  
About the rates of pay.

\* \* \*

I fancy then they tore rocks  
With elemental fire,  
And, doubtless, used the aurochs  
(Our cattle's pristine sire)  
To do the heavy hauling  
Of timber and of ore;  
He'd take a load appalling,  
That animal of yore.  
I fancy that the pay-roll  
Was totted up in runes:  
He must have had a gay role  
Who paid off those poor prunes  
For then there was no specie;  
(Pray bear that fact in mind).  
The workers, stark and greasy,  
All took their pay in kind.  
So when a worker wanted  
To get his pay in wife,  
How sorely he was taunted,  
How wretched was his life,  
When pay-day brought him merely  
A fig leaf or a skin!  
He must have cussed sincerely  
The chap who took him in!

\* \* \*

When men first started mining,  
One prehistoric day,  
No doubt there was repining  
About the rates of pay.

J. C. M.

[Editor's Note. — These verses belong to a suite that marks a departure in colorful descriptive poetry. Just in what direction they depart it remains for the reader to discover.]



# An Iron Ore Industry for Ontario

A PRACTICAL PROPOSAL FROM TWO  
MINING ENGINEERS

By A. HASSELBRING AND GEO. W. McLEOD

As a result of the investigation being carried on by the recently appointed Ontario Iron Ore Committee, we here offer some suggestions and remarks that we hope will be useful to the Committee and that we also hope will cause some helpful discussion among those throughout the Province who are interested in the iron ore question.

There are in Ontario many deposits of iron ore, all of which fall under three main heads, i.e. Magnetite, Hematite and Siderite. These classes may again be subdivided into numerous groups.

## Magnetite

Under Magnetite we have in Ontario three main subdivisions.

1. *Low-grade magnetite.* The low-grade magnetite must again be sub-divided into two classes, A.—Those deposits that consist of alternate bands of fairly high-grade ore and silica. (The Big Dave Property in the Michipicoten area is an example of this type of deposit.) B.—Those deposits that are uniform throughout in their composition, the silica being intimately mixed with the magnetite. (Examples of this type are the Goulais River deposits and the larger part of the Moose Mountain deposit.)
2. *Good grade magnetite with high sulphur content.* An example of this type is the deposit at Atikokan Mine.
3. *Titaniferous Magnetite*, extensive deposits of which occur in the Rainy River District as well as at other places throughout the Province.

## Hematite

1. *Low-grade, high silica hematite* fairly uniform in character; examples of this are found in the deposits in the vicinity of Lake Nipigon.
2. *Low-grade banded deposits*, where some of the bands consist of a fair grade of ore. A deposit of this type is found in the vicinity of Loon Lake, 26 miles east of Port Arthur.

The only known body of high-grade hematite of any considerable size is located at the Josephine Mine in the Michipicoten District. This body contains less than a million tons of recoverable ore.

The Helen hematite deposit has been worked out.

## Siderite

This ore may be classed under two headings; high sulphur siderite and low sulphur siderite.

An example of the first type is the Helen siderite deposit and an example of the second type is the Magpie Mine deposit.

## Large Known Ore-Bodies

There are in Ontario several ore-bodies with large known tonnages that come under the types mentioned above. Some of these ore-bodies have been proven by diamond drilling and by exploration work while natural exposures on others show that they contain immense tonnages.

Among the most conspicuous of the proven ore bodies are the Helen high sulphur siderite, the Moose Mountain low-grade magnetite and the Atikokan high sulphur magnetite. The most prominent of the naturally exposed ore-bodies are those near the Goulais River, which consist of a low-grade magnetite uniform in texture.

## The Problem

We have given an outline of the different types of ore-bodies that exist throughout Ontario to show that totally different treatment is necessary for the beneficiation of each individual type of deposit. No two of the types of deposits mentioned above are amenable to the same treatment. For some types the treatment may be the same up to a certain stage, but the final stages will be radically different for each type, so that the beneficiation of each type is a separate and distinct problem, requiring a separate solution. To reach a commercial solution for the beneficiation of any deposit will require very careful study and experimental work on the ore of that deposit. First, work must be carried on in the laboratory and then experiments carried on to duplicate this work on a commercial scale.

The present Iron Ore Committee is, if we understand rightly, to get out its report and recommendations by an early date. Most of the men on this committee are in a position to give only part of their time to the investigations being carried on. It is obviously impossible, under these circumstances, for them to make a specific investigation of the treatment necessary for the beneficiation of the ore of even one of these deposits and they must of necessity limit their report to generalities, comparisons and recommendations. It is for the purpose of aiding the Committee in their recommendations and, if possible, of creating discussion among the men interested in the iron ore situation of Ontario, that these remarks are offered.

## Huge Tonnages Available

The first question that naturally arises is, "Does Ontario contain iron ore bodies of sufficient size and quality to warrant specific investigation?"

To answer this it is only necessary to point out such ore-bodies as the Atikokan, with several million tons of proven ore averaging between 55 per cent. and 60 per cent. iron, but with a sulphur content of slightly over 2 per cent. The Moose Mountain ore-body has an estimated ore reserve of 38,000,000 tons for each 100 feet of depth. This ore contains 36.7 per cent. iron but is high in silica, averaging 45.2 per cent. There is another ore-body of a similar type at the Goulais River. From natural exposures it is estimated that this body contains at least 50,000,000 tons of ore containing 34 per cent. iron and 52 per cent. silica. The Helen siderite body has been proven by drilling and development to contain nearly 100,000,000 tons of ore averaging 35.96 per cent. iron and 2.49 per cent. sulphur. This ore has a loss on ignition of 30.56 per cent. which brings the iron content in the finished product up to 51.79 per cent.

Experimental work for the beneficiation of these ores has been carried on with varying degrees of success. In the cases of the Helen, Moose Mountain and Atikokan deposits, very large sums of money were spent by private interests.

At the Magpie Mine, low sulphur siderite was successfully roasted on a commercial basis for a number of years. Unforeseen conditions on the lower levels of the mine had more to do with the closing down of this operation than any defect in the method of treating this ore.



The treatment necessary for the Helen high sulphur siderite is very similar to that required for the Magpie ore, the variation not being great enough to effect radically the method of operation, so that a close estimate can be made of the cost of treating Helen ore from the data obtainable from the Magpie operation.

Similarly, estimates can be made for the cost of the treatment of some of the other deposits, by a comparison with the successful operations now being carried on, on a commercial basis, at other mines on similar ores.

With undisputed data available to show that Ontario contains very large deposits of low-grade iron ore, the question is: "What measures must be taken to procure a production of iron ore from the Province?"

We might state here that we do not believe that an attempt should be made to obfuscate the beneficiation problem before the Iron Ore Committee, with the problem of exploring or prospecting for iron ore. There are too many prospects throughout the Province that warrant having work done on them, to allow the Government to undertake such work without causing friction with, and unjust comment from, property owners not favored with having such work done on their properties. Any aid given by the Government along these lines should be confined, as heretofore, to the able work of the Geological Branch of the Ontario Department of Mines. This, then, brings us to specific recommendations to deal with the beneficiation problem.

#### *A Practical Suggestion*

To deal with this problem we would suggest the appointment of a permanent commission by the Ontario Government. This commission should consist of a mining engineer familiar with large-scale mining operations and capable of estimating costs on such operations, and a metallurgical engineer, familiar with the beneficiation of iron ores. This commission should have the power to call in expert advice on such problems as transportation and finance when they find it necessary. This commission would be instructed to examine in detail deposits where a large tonnage is proven and report on the feasibility of operating such deposits, with or without beneficiation. We do not think that, at this time, any deposits should be investigated by the commission, unless a large tonnage has been definitely proven.

After the commission have satisfied themselves that a sufficient tonnage is available in a deposit for a commercial operation, their duties would be to definitely determine the beneficiation method necessary on this ore to make the operation of this ore-body a commercial success.

If the commission is satisfied that any deposit can be mined and the ore beneficiated successfully on a commercial basis, they will then recommend that this deposit be operated. They will also recommend the scale on which operations will be carried on, that is, the tonnage of merchantable product.

As the Provincial Government has appointed an Iron Ore Committee to look into the iron ore situation in Ontario, we take it for granted that they are willing to give financial assistance to any operation warranting it. Our suggestions, as to the nature of this assistance, are as follows:

If the commission deems that a deposit can be successfully operated then the Government is to finance the beneficiation and of the operation. The Government

will advance to the operating company enough money to finance a complete beneficiation plant, to handle the ore from the time it passes a three-inch ring until the finished product is delivered on cars. If the Government is willing to do this, it is of course obvious that they must be safe-guarded in their investment. This can be accomplished along the following lines: For the money advanced, the Government is to receive a lien on all of the mining claims on which operations are carried on; the Government to have on the staff of the mining company an accountant who will have access to the books of the company at all times; the Government, should they so desire, may also place on the staff of the mining company an engineer to act in an advisory capacity on the construction and operation of the beneficiation plant.

It is understool that the operating company will take care of all mine development and installation necessary to bring the ore to a three-inch ring, the financial aid given by the Government to be entirely for beneficiation purposes.

We do not think that the Government should demand from the operating company anything more than a nominal rate of interest, and we think that the operating company should be given liberal terms on the amortization of the investment. To be specific, we think that the interest rate should be two per cent, and that the amortization period should cover twenty-five years. This would allow the operating company to repay both the interest and capital at an annual rate equal to five percent on the original investment. It is, of course, necessary in a plan of this nature that both the operating company and the Government be willing to assume their share of the responsibility involved.

Under this plan the company owning the deposit would be required to bring it to such a stage of development that a large enough tonnage of proven ore existed to warrant a commercial operation for beneficiating this ore. They would be required to finance and build a complete plant for mining the ore, should the Government decide to build a beneficiating plant.

The Government for their part would carry on all experimental work connected with the determination of the beneficiation method necessary for the ore of this deposit. They would also finance the erection of the beneficiation plant and all equipment necessary in connection with it, after the beneficiation method had been worked out, the cost of the experimental work on any deposit to be borne by the Government and not to be charged to the total capital expenditure for that deposit. If the Government is willing to do this it seems to us that the company owning the deposit should be willing to safeguard the Government in their investment by giving the Government a lien on the property as mentioned before.

The question might come up as to whether this constitutes a sufficient safeguard. We believe that it does. We think that an operation conceived and planned along these lines offers as sound an investment as the average industrial investment. If through any unforeseen circumstances the project should not prove successful, the Government would still have a claim on an ore-deposit which at some time in the future could be operated at a profit. The known high-grade ore deposits of North America are being worked out at a rate that will eventually cause the lower grade deposits to be operated.



Under this plan the cost to the Government of establishing an iron ore industry in the Province would be hardly nominal. The interest it would receive from the money set aside for beneficiation plants should be enough to cover the cost of experimental beneficiation work and any cost incurred by the permanent Commission, so that the only cost to the Government would

be the loss of interest on money set aside for the construction of beneficiation plants.

If there are any benefits to be derived by the Province from having an iron ore industry established within its borders, such benefits will surely warrant the outlay of the money required under this plan.

#### NEW MINE AT BRITANNIA

This panoramic view of the new camp on the Victoria mineral claim of the Britannia Company, Vancouver Island, is interesting as illustrating the extensive development work that the Company has been carrying on simultaneously with the re-construction of its plant, offices, and townsite at Britannia Beach, all of which were destroyed by fire and flood. The aerial tramway will be noted running from the bunkers near the ore dump. It connects the portal of the main adit on the Victoria with the portal of the 1600 foot level adit of the Empress Mine. The big dumps seen are composed chiefly of ore that has been taken out from the working

openings in the Victoria Mine from the 1900, 2000, and 2100-foot levels as a result of development alone. No stoping has been done.

In the foreground are bunk houses, dining room, recreation hall, store and office of the assistant foreman. There also is the saw mill which has a capacity of 2500 feet of lumber, board measure, per day. In the background are snow sheds and compressor plant and behind the tramway may be seen the top of the shaft-house over the Victoria shaft.

Work was commenced on this camp on June the 24th 1921, in the virgin forest and the photograph was taken some two months ago.



Victoria Mine, Britannia Mining & Smelting Company, Vancouver Island, B. C.

#### BLANCHE RIVER AREA

##### *Geological Report Issued*

The Ontario Department of Mines has now ready for distribution Part 3, Vol. 31, 1922 — *Blanche River Area* by A. G. Burrows and P. E. Hopkins. The map accompanying this report was ready for issue over a month ago and was noticed in these pages on December 15th. The report comprises 22 pages, well illustrated with photos and diagrams. The field work was done mainly in the summer of 1921 and was completed in May, 1922, so that the issuance of this report so soon after the field work was finished reflects the greatest credit upon the Department.

The central part of the area was, before the disastrous fires of last October, a prosperous farming community. The clay ground in the valley of the Blanche River and its tributaries is eminently suited for agriculture, and constitutes a small clay belt, subsidiary to the great clay belt to the north through which the Transcontinental Railway runs.

The only productive mining of the region has been at the *Coney Cobalt Mine*, north of Lake Temiskaming, which has produced about three million ounces of silver. On the eastern shore of the Coney Silver Mines in Coney township

on the Montreal River, some small shoots of high-grade silver ore have been found and a few tons shipped to Cobalt. Venis on the property of the Triangle Silver Mines in Auld township also show bunches of rich silver ore.

Gold has been found so far only in Bryce township, in the western part of the map area, where shear zones carrying values in gold occur in light-colored volcanic rocks of Keewatin age. In Bayly township, adjoining Skead in the northern part of the map-area, there is an area of the andesite rock that is known to contain gold in the latter, but no gold has yet been found in Bayly township.

Wendigo Lake, on the old canoe route to Larder Lake, shares with numerous other localities a fame for cobalt bloom — *without* silver. Of present interest is a water-power available at its discharge, partly developed by the Canadian Associated Goldfields interests.

At Charlton a hydro-electric plant furnishes 1200 horsepower for the Kirkland gold mines. It is pointed out that a fall of 138 feet on the north branch of the Blanche River in Marter township, lot 2 (11!) Con IV will develop 2,000 horsepower.



# Bank of Commerce and Mining

By ALEXANDER GRAY

The Annual Survey of Sir Edmund Walker is true to the text. For twenty years, even since the discovery of Cobalt, the Bank of Commerce has annually demonstrated by official utterances that it is the consistent advocate of sound mining, and more of it, if mineral resources are to function for the common weal. Year after year, primarily advised by the fully-informed Logan—at first Branch Manager at Cobalt and now chief of the Foreign Exchange Department—the Canadian Bank of Commerce has spoken without the aversion that has militated against mining among those who could have lent the weight of their influence and capital in behalf of development without resort to scrambling for small change.

Personally identified with a section of the Nickel Industry, Sir Edmund Walker has been in a position to speak with first-hand knowledge; therefore it is altogether refreshing to have him reassert his confidence in mining in industrialism and to urge what other bankers are so chary about prescribing as a remedy for Canadian shortcomings. The Royal Bank, the Bank of Montreal and once more the Bank of Commerce, having admitted diversified mining to the charmed circle of domestic capitalists, perhaps, when the Dominion gets its bearings and bankers have a freer hand, well-conceived mining ventures will be regarded with less suspicion and banks will not be censorious toward customers engaged in mining.

Not so long ago a banking directorate, altogether pleased with the accretions from bullion going forward to American mints, had half a doubt lest "gold bricking" be possible, since advances were being made against ingots in transit through the bank. Instantly an order was given to bring some of the bullion briquettes from the bank vaults. To the astonishment of the assembled directors, whose misgivings were accentuated, the gold bars were so discoloured that they conveyed no hint of their precious character. "Is that gold?" ejaculated one skeptical arbiter of our fiscal destiny.

The incident serves to emphasize what leading bankers now are beginning to comprehend. Before the mineral deposits of the Dominion can attain to the dignified status they are entitled to, it is essential that the Bankers Association give due prominence to precious metal miners as the sources of wealth without which the balances are out. At the moment, when the world wants the funds, the Witwatersrand is producing over \$500,000 each day, the highest financiers realizing that money in circulation is infinitely more useful than gold in the ground. Nearly 800,000 ounces per month is coming from those gold mines, while Canadian politicians quibble about providing power facilities and whittle appropriations for geological and mines departments. Now we have forcible response to those who decry mining. "What is Hollinger, anyhow?" petulantly queried one branch manager a few years ago, when a client sought a small credit and tendered Hollinger shares as security. His chief has recently made answer. Without the 8,330,091 ounces of gold in 1919; 8,153,625 ozs. in 1920; 8,114,586 in 1921, and about 7,000,000 ounces in 1922 (altogether the first two months of the last year was somewhat of a blank owing to the miners' strike,) South Africa would be disconsolate, and international exchange less stable. The Rand is making records. Ontario and British Columbia are prepared to proceed with larger operations—and for this we have these remarks of Sir Edmund Walker:

## *Increase in Gold Production*

"It is in gold mining, however, that we are making the most striking progress and attracting the most attention from the outside world. The increase in production for the year is about 31 per cent as compared with 1921, and the output of several of the most important mines is being enlarged and promises to be much greater in future. Ontario leads the other provinces as a producer of gold and indeed of metals as a whole, and she has now passed California in gold production. Our gold production is as yet only small in proportion to that of the Transvaal, but one mine alone contemplates an increase in production which would very largely affect this comparison. We have passed the period of low prices for metals, which reached a climax in 1921, as well as the worst point in the world wide depression of general business, and while the markets for some minerals are as yet far from normal, we may on the whole look forward to an increase in both production and profits.

## *Our Coal Mines*

"The year has been an unsuccessful one for the coal mines of Western Canada. There the mine owner is struggling with strikes, high labor and transportation costs and a small market, made still smaller by cheap oil. Some day the abundant coal measures of British Columbia, Alberta and Saskatchewan will entirely supply all of Western Canada from the head of lakes to the Pacific, as well as a large ocean-borne trade, and a trade with the United States, and perhaps with Ontario; but while oil is cheap, population thin and transportation dear, the development of all this natural wealth is surrounded with difficulties. There should probably be fewer mines, so that the natural prosperity of those most favorably situated would not be prevented by the competition of those which have little chance of success. The mines of Nova Scotia and New Brunswick, on the other hand, cannot, as yet, produce enough coal to lessen, as we certainly should as far as possible, our coal imports from the United States. These imports, mostly for the use of Ontario and Quebec, constitute about 60 per cent. of our consumption of coal.

## *Mines and Transportation*

"The newer countries of the world are apt to be known in the world's trade circles by some main product upon which their prosperity, or the lack of it, principally depends. Canada is classed as a wheat country, and it will doubtless be found that our prosperity depended in the past largely on the quantity of our wheat crop and its price. We are, however, year by year attracting the attention of the world to the position of Canada as a mining country. The products of mining show more readily than almost any others that the ultimate money value of any commodity depends on the cost of transporting it to a market. We have more coal than any country in the world, except the United States, but the high state of development of water-powers, "white coal," as we call it in Ontario and Quebec, where no coal exists, is the evidence of our inability to transport coal from other provinces, and the bill for the coal we buy from the United States is one of our serious national burdens. Some day the improvement of our waterways will materially change this and, similarly, the growth of our population, our industries, and our systems of both land and water transportation, will make it profitable to mine many ores which have no money value just now. Gold, silver and a few other ores will, when refined, or partly



so bear the cost of transportation and these are, therefore, the first loss of the prospector.

#### *Mineral Possibilities*

In the remarkably thoughtful address of the late president of the Canadian Institute of Mining and Metallurgy we are reminded that while we are a great factor in the world's food supply, this comes from the partial development of about fifteen per cent. of the area of Canada, while in the remaining eighty-five per cent., and to some extent, of course, in the fifteen, we have 'mineral treasures of inconceivable value.' The selection of land for agricultural or pastoral purposes is one of the easiest tasks of the adventurer, the discovery of a real mine one of the hardest, apart from the few cases where men have found fortunes by sheer accident. Twenty or thirty years ago we had little experience or training in mining, and a good deal of what we have now arises from the success attained in mining in the United States. In South Africa, however, there are many miners, both those who hold executive positions because of scientific ability and those who have owned mines and are not afraid of such ventures, and we have reason to hope that some of the leaders among these men will become interested in our north country.

#### *A Wonderful Heritage*

For three-quarters of a century our geologists and other Canadians of reasonable intelligence have known that we possess in central Canada the largest area in the world of the oldest rocks and of the rocks immediately following these, all roughly classed as pre-Cambrian. These are most promising areas for the prospector, but we also possess in the Maritime Provinces and Eastern Quebec our share of the Appalachian mountains and in the far west our share of the vast Cordilleran areas. Of gold, silver, nickel, copper, asbestos and other metals we are already important producers. We have iron ores in plenty, but these are not so readily available as the ores mined in that comparatively small extension of our pre-Cambrian area into the United States, which is so wonderfully rich in iron and copper as to be famous throughout the world. What we have accomplished thus far in the three great mining areas has been largely the result of accident; we can hardly pretend that there has been serious prospecting in many of the mining fields of Canada, except by a very small number of trained experts. The Cordilleran or Pacific mountains in Canada form an area about as large as the pre-Cambrian in the centre of Canada, and of this the late President of the Canadian Institute of Mining and Metallurgy says: 'Does anyone know of any sufficiently sound reason, even after allowing for certain known differences of glaciation and geological formation, for thinking that Canada's share of this great area will prove to be less rich in minerals than that falling to Mexico or to the United States?'

This coming from one of the trio of leading bankers, it remains to quote an extract from the year-end comment of deputy Minister of Mines, Gibson:

"There seems at the present no reason to doubt that the mines both at Porcupine and Kirkland Lake may, notwithstanding increased production, go on year by year, increasing the amounts of ore in reserve. This affords the best of reasons for increasing their capacity for turning out bullion."

But where is the necessary hydro-electric power and the pre-requisite capital?

No one worthy of trust wishes to have banks take unnecessary risks or to countenance over-speculation; only the reckless would like to have them ignore factors of safety. That, however, is not an issue, because the banks will

adhere to correct principles. It is in the policy of frowning upon prudently conducted mining enterprises, that the banks go to the other extreme. They are rather chary just now of all industrial movements, and it was in this connection the other day that Charles M. Schawb addressed the New York State Bankers Association and said:—

"Why should the banks discriminate against the industrial securities? They are founded on the ability and integrity of those who manage the industries, they are founded on the future of the country. All the money of the United States Government will not be enough to support the industry of the country in the future."

Mr. Schawb speaks as the father of a giant corporation, a mining and manufacturing Goliath. He operates mines and mills, in North America, South America, and Cuba. He speaks with force to bankers.

### LETTERS FROM READERS

#### *Mr. Holding Objects*

To the Editor, Canadian Mining Journal:

Sir:—My notice has been attracted lately to your articles on wild-catting, and the unscrupulous way in which mining companies are being organized for the sole purpose of milking the public. I have had more than my share of experience with one of these to which your article might have been meant to apply, and this might lead some people to believe that I am one of the principals in the undertaking alluded to.

I refer to a newly organized company, under the name of the "Holding Consolidated Company, Limited." I would like to clear myself of any unjust imputations by stating a few facts.

I was the discoverer of the Holding mining claims in the West Shining Tree district, and still hold 75 per cent. interest in them. These claims were optioned to others, and I have had no hand in the incorporation of the company alluded to. I have endeavoured by every means possible to prevent any manipulation by which any person could be deceived.

My claims were, and still are under the incorporated name, Asquith Gold Mining Co. I had no knowledge of the Company mentioned above until I saw it in print.

ROBT. HOLDING.

Chapleau, Ont. ,

The "Turf" shaft of the Village Deep mine is the deepest on the Rand, South Africa, if not in the world. Its vertical depth is 6,263 feet, which is 629 feet below sea level. During November last it produced 59,000 tons of ore, averaging 6.8 dwts. in gold, at a profit of £20,000.

With a total production capacity of about 12,000,000 tons of pig-iron per annum, the United Kingdom made during 1922 only 4,865,000 tons, which is, however, a notable advance over the 2,616,300 tons of 1921. The price in Britain is now only 25 p. c. in advance of that prevalent before the war.

The antimony mines of China have for many years furnished more than half the world's supply. As the ores are, in general, low-grade, it is not likely that the present price of antimony will be reduced materially.



# The Province of Quebec

The Largest Province of Canada, Great Timber Areas,  
Mineral Wealth and Water Power

By Lt.-Col. P. PELLETIER, Agent-General for Quebec,  
in "Raw Materials Review" of London (Eng.)  
(Abridged)

The Province of Quebec, the most easterly portion of the Dominion, comprises one-fifth of the total area of Canada, and is 703,653 miles in extent. Practically maritime, stretching along both sides of the great St. Lawrence waterway, it is the ocean gateway into Canada, and for eight months of the year all exports from the Dominion to European markets and all Atlantic borne imports into the country, pass through the sea-ports of Quebec and Montreal.

The great potential wealth of this Province is in her timber, and timber products, mineral wealth, and great water powers.

\* \* \*

## Minerals

No adequate estimate in money value can be made of Quebec's potential mineral wealth, because only a small fraction of the mineral deposits have been prospected. Stretching across the northern part of both Ontario and Quebec is an enormous pre-Cambrian area, nearly surrounding Hudson Bay, and occupying more than half of the entire surface of the country. It is the greatest single exposure of the earth's basement in existence.

A small spur of this area, amounting to about three per cent. of the whole, projects into the United States, south-west of Lake Superior. Small as the spur is, it produces annually more than 80 per cent. of the entire output of iron ore in the United States. When one considers that the Province of Quebec extends north to Labrador along the whole length of the eastern shore of Hudson Bay, taking in the greater portion of the pre-Cambrian area, one feels justified in thinking that the metals and minerals of Quebec are practically inexhaustible. A conservative estimate places the area covered by this ancient series of rocks as 90 per cent. of the entire Province.

Quebec, however, has not yet seriously turned attention to the exploration and geological mapping, much less to the prospecting, of this huge area. The attention of the Quebec mining men has so far been largely directed to the rich mineral deposits of the Acadian Highlands, which occupy the Eastern Townships and Gaspé Peninsula on the Gulf of St. Lawrence. In these areas asbestos, chrome, pyrites, copper, lead, zinc, and gold ores are being or have been mined.

In those parts where geological examination and prospecting have been carried out, deposits of iron, copper, nickel, gold, and silver has been found. Over much of this mining area in the north of the Province, lumbering will for many years be an important industry, as much of the area is covered with valuable forests.

\* \* \*

## Asbestos

Quebec produces 88 per cent. of the asbestos of the world. The output for the year 1919 was 136,199 tons valued at £2,200,000, and in 1920 the output had increased to 199,573 tons valued at £2,958,440. Trade

depression, which is world-wide, seriously affected this industry, and in 1921 the shipment of fibre amounted to 87,475 tons valued at £1,039,957, the lowest record in output since 1910 and the lowest in value since 1916. This constituted a decrease of 51.3 per cent. in tonnage and 64.7 per cent. in value. The stocks on hand, stored in mill-sheds at the close of 1921, amounted to 53,345 tons.

At a time when a great endeavour is being made toward inter-Imperial trade, it is interesting to note that, while the British Empire produces, up to the present, the raw asbestos of the world, the United States ranks first in the production of manufactured asbestos articles.

## Mica

Canada ranks second in the world-production of mica, and the Province of Quebec produces 80 per cent. of the total Canadian production. The province possesses almost a monopoly of phlogopite mica, the deposits of the greatest economic value occurring within an area of 520 square miles in the Gatineau district directly north of the city of Hull.

Mica is a crystalline silicate of aluminium and other metals, notably potassium, sodium, magnesium and iron. It is either mined or quarried, and comes out in blocks of crystalline layers, which are split into thin plates. The commercial varieties of mica are muscovite or potash mica, and phlogopite or magnesia mica. Until recently only sheet-mica measuring 2 by 4 inches was of commercial value, the smaller stuff going on to the waste heap.

A process has been established whereby mica sheets can be built up from thin plates of scrap mica pressed together by hydraulic pressure and cemented with shellac into sheets of any thickness and size required. Such material is known upon the market as "Micamite," and is now replacing to a great extent sheet mica in commutators, especially in large machines. This new material is widely used, and is produced in large quantities, finding a ready market for all insulation purposes. Finely-ground mica is also used in paints and lubricants, thus all waste has been eliminated.

The production of mica for the year 1921 was the lowest since 1898, only 288,197 lbs. being mined valued at £8,444. Of this amount the United States took 88 per cent., England 10 per cent., and other parts of the world 2 per cent.

## Titanium-White

Titaniferous iron ore occurs in very large quantities on the north shore of the lower St. Lawrence as well as north of Montreal in the Laurentian plateau. It is proposed to use titanium compounds derived from this ore largely in paints to replace white lead.

The titanium-white is prepared by pulverizing the ilmenite and treating it with hot commercial sulphuric acid, thus forming sulphates of iron and of titanium, which are soluble in water. On ebullition, the titanium hydrate is precipitated. This is neutralised by



barium carbonate and calcined. Another method used consists in fusing ilmenite in an electric furnace with fluxes.

Titanium white has a very high index of refraction, and consequently high covering power; it is not poisonous, and with linseed oil it gives a paint which is not acted upon by sea water. One kilogram of titanium white is estimated to cover 20 square metres, whereas one kilogram of white lead covers only 9.1 square metres.

#### *Feldspar*

Feldspar production is increasing to a remarkable degree, and is an assured industry. In 1920 only 849 tons were produced, valued at £2,250, while in 1921 this had increased to 9,797 tons, valued at £15,950. A rich deposit is being worked north of Buckingham. It is situated 300 feet above the level of the valley, and is opened in two benches showing a combined height of 40-ft. face. The deposit shows a width of 50 ft. of workable spar, and is 300 ft. along the strike. The spar, as now shipped, is practically pure orthoclase. The analysis shows 10 to 13½ per cent. potash, 1 to 1½ per cent. soda, and 4 to 5½ per cent. free silica.

#### *Other Minerals*

Chromite is produced in paying quantities, and oil shales occur throughout the Province. Quebec has rich quarries of marbles, and building materials of various kinds. The products of the quarries during 1920 amounted to £2,410,971, and were made up of slate, clay, sandstone, granite, marble, and limestone.

The amount of limestone produced in 1921 was 1,007,733 tons, valued at £304,605, while the marble for the same year was valued at £33,532. Lime and cement are produced in large quantities, the cement output for 1921 being 2,135,631 barrels, valued at £1,082,053. The manufacture of cement is one of the important industries.

Granite quarries produced £100,000 in 1920, and brick making is carried on extensively. Slate and sand are produced in large quantities.

Concrete is used largely in all the construction work in the Province. Molybdenite occurs in large quantities, and is used extensively in the steel industry, especially in producing steel for automobile parts. Zinc and lead, as well as gold and silver, are produced, but as yet in small quantities.

Quebec is one of the chief producers of aluminium, and has at Shawinigan Falls one of the largest aluminium plants in the world, although as yet no bauxite has been found in the Province.

\* \* \*

#### *Water-Power*

Nature has deprived this province of coal, but in its place she has endowed Quebec with such a wealth of water-power that in the natural course of events the Province should develop into one of the greatest manufacturing centres in the British Empire.

According to the latest estimate of the Department of Lands and Forests, the gross water-power of the rivers is probably 15,000,000 horse-power. Two important dams have already been built, while the Gouin reservoir on the Upper St. Maurice River constitutes what is one of the largest reservoirs in the world. Its capacity when full is 160,000,000,000 cubic feet, and

the water area is 300 square miles. This storage permits of a regulated permanent flow of over 12,000 cubic feet per second at Shawinigan; or in other words a capacity for developing regularly 1,000,000 units of power.

The St. Francois dam, although of less importance, stores 12,000,000,000 cubic feet at its fullest capacity, and will prove of great value to the numerous pulp and other mills along its water course. It is estimated that if a dam were built at the outlet of Lake St. John, the water-powers on the Grande-Décharge or on the Petite-Décharge would be increased to 800,000 horse power.

The principal hydraulic plants have installed turbines capable of developing 823,274 horse power. It is estimated, according to Government reports, that the capacity of the water-powers at present developed in the Province, is 900,000 horse power. The electric current from these great plants is carried hundreds of miles on great steel towers into the various municipalities, for use in industrial concerns.

Many of the municipalities grant tempting bonuses and tax exemptions to capitalists, in order to induce them to establish manufacturing plants in the various districts. Municipal councils in Quebec have the substantial backing of the Government, and on March 4, 1918, a Department of Municipal Affairs was created with a Minister in charge. This represents a new departure in Governments but one calculated to create confidence in investment in the Province.

In this Province Government revenue always exceeds expenditure and taxation is low. Labour is well organised under the present system and strikes are practically unknown.

#### MINING EQUIPMENT FOR BINGO MINES

Bingo Gold Mines, Limited, have just placed an order for a complete mining plant with Engineering Equipment Co., Ltd., of Montreal. Mr. J. A. Davis, of Engineering Equipment Co., has just returned from a visit to the mine, which is on Herb Lake, 23 miles from mileage 82 on the Hudson Bay Railway.

After an early experience with stock-jobbing that resulted in little actual work on the claims, the Bingo property passed into the control of London investors and now is being explored systematically by them. Dr. J. S. DeLury, of the University of Manitoba, has examined the gold showings thoroughly and has reported very favourably on the prospect of their providing sufficient ore to make a paying mine.

A shaft is down about 200 feet and from this shaft it is proposed to explore and develop the ore-shoots of a series of small parallel veins that show very promising values at the outcrop. The installation of the new mining plant will mark the commencement of a vigorous campaign of development on this, one of the more promising of the gold prospects in Northern Manitoba.

Before the war Germany imported about half her requirements of nitrates. During the war nitrogen fixation processes, notably, that of Haber and Bosch were applied industrially, and now are capable of supplying Germany's full need if worked to capacity. Their production in 1922 was 300,000 tons of synthetic nitrates, and it is estimated that the production for the next year will be 350,000 tons.



# Salmon River District, B. C.

## REPORT ON GEOLOGY OF AREA CONTAINING PREMIER MINE

The Geological Survey, Ottawa, has just published Memoir 132, *Geology and Ore Deposits of Salmon River District, British Columbia*, by S. J. Schofield and G. Hanson. This report of 73 pages is most important and timely. It includes a geological colored contour map on a scale of 4,000 feet to the inch, six sketch maps and six photos. The region was studied by J. J. O'Neill in 1919 and by Messrs. Schofield and Hanson in 1920. The final chapter comprises a brief general study of the ore-deposits of British Columbia, which forms an excellent basis upon which to build up a detailed knowledge of the Province's various mineral deposits.

The map area, 11 miles north of Stewart, at the head of the Portland Canal, contains the Premier mine and the International, Bush, Indian, Big Missouri, Mineral Hill, Spider, Hercules, Forty Nine and other prospects. The Premier is the only producing mine so far.

### Geology

The Salmon River area is near the eastern edge of the Coast Range batholith. The rocks are principally sedimentaries and volcanics of Jurassic age which were folded and then intruded by the huge batholith in late Jurassic times, and subsequently denuded. The ore deposits are connected with minor intrusions that marked the last phase of the batholithic intrusion.

In discussing the general aspect of the district's economic geology, the writers make this most important statement: "The geological conditions which surround the Premier extend hundreds of miles north and south, along the eastern flank of the Coast Range batholith, and it is most probable that other properties similar to the Premier will be discovered in this large unprospected area. Keno Hill in the Yukon, the Engineer mine of Atlin, and the Dolly Varden mine of Alice Arm, are other properties in this great belt of mineralization. The occurrence of such high-grade ore as occurs in the Premier mine proves conclusively that there are ore-bodies in British Columbia that can be made to pay from the outcrop.

"Most of the ore-bodies are associated with the quartz porphyry sills at their intrusive contact with the tuffs of the Bear River formation . . . . The most favorable geological conditions for the occurrence of ore in Salmon River area appears to be found at the following places: At the contact of the quartz porphyry with the tuffs; in certain beds of the tuff and tuffaceous conglomerate; in the quartz porphyry sills. The slates, although mineralized, do not appear favorable for the deposition of commercial ore-bodies." These statements constitute practical directions for prospectors or for geologists or engineers directing the operations of prospectors.

### The Ore Deposits

The characteristic minerals of the deposits are native silver and gold and a long series of sulphides and sulpho-salts rich in silver.

As at the Dolly Varden mine to the southeast, secondary enrichment has played an important part in producing the bonanza ore of the Premier. The geological studies indicate that, though the high silver

values are likely to cease within a few hundred feet of the surface, as at the Dolly Varden, the Premier ore is likely to carry good gold values to a much greater depth.

In discussing the ore-deposits, the writers distinguish between the following types:

(a).—A low-grade, complex type, with values in the base metals, copper, lead and zinc. (Big Missouri, Hercules, Forty-nine, etc.)

(b).—A type rich in silver minerals, including tetrahedrite, freibergite, pyrrargyrite, argentite, and in some cases native silver. (Premier, Silver Tip, certain ore-bodies on Forty-nine, Big Missouri and Mineral Hill.)

(c).—A pyritic, siliceous type with high gold values. (An ore-body in Premier mine).

It is stated that the sulphides rich in silver, such as tetrahedrite, freibergite, argentite, and some of the pyrrargyrite are of primary origin and will continue in depth. The native silver is of secondary origin.

### A Geological Study

The final chapter on *Ore Deposits of British Columbia*, by Dr. Schofield, compresses into ten pages an unusually informing and suggestive study of the province's principal mineral deposits. He divides the mineral history of British Columbia into two periods, that from 1871 to 1905 being the "exploratory period" during which the pioneer geologists discovered and correlated the main facts of the region's mineral deposition and delineated the zones favourable for prospecting; and the second period, from 1905 to the present, characterized by intensive geological study and active exploration, during which time most of the ore-deposits now known have been found.

The province's great mineral-bringer has been the batholithic intrusion that skirts the coast and then swings inland along the international boundary. The deposits on either side of this intrusive mass are characteristic of that side. To the west the ores are mainly copper-bearing, while to the east and north they contain mainly gold, silver and lead. To the west are Anyox, Marble Bay, Quatsino Sound, Sunloch, Britannia; to the east are Salmon River, Premier Mine, Bear River, Alice Arm, Dolly Varden mine, Hazelton (excepting Rocher Déboulé), and the deposits in the Ota Lake and Whitesail Lake areas. In the interior the same distinction holds, the Boundary belt including Copper mountain, Phoenix, Deadwood, and Rossland, while the northern or Kootenay belt includes Ainsworth, East Kootenay (Sullivan, North Star, St. Eugene), Slovan, Lardeau, Revelstoke and Stump Lake.

A geological study gives a good reason for this difference. The great batholithic intrusion and its flanks have been cut (by erosion) in a plane at an angle to the original surface, dipping toward the east, thus exposing the eastern flank at a greater depth than the western. Thus it happens that the western flank, characterised in general by roof pendants and a high degree of metamorphism, has copper deposits characteristic of conditions of high temperature and pressure, while the eastern flank has geological and mine



ological conditions characteristic of the lesser metamorphism that can be expected on the sides of an intrusion.

Unlike the ore deposits of the great pre-Cambrian area of central and eastern Canada, those of British Columbia are connected almost exclusively with the intrusive period of late Jurassic times. The intrusion has, fortunately for the province's future mineral production, stretched along two sides, the Pacific and the

international boundary. Bearing in mind the ore-deposits already determined in this huge area of potential mineral production, Dr. Schofield is ready to commit himself thus: "Subsequent to, and largely because of, the labour of these men [the pioneer geologists], a great mining industry has developed and there are enough good prospects in sight to warrant the statement that the industry will grow with an ever increasing speed."

## Raw Material for Fertilisers in Canada\*

(Specially Contributed by Natural Resources Intelligence Branch.)

At the present time Canada's main supply of nitrogen, most of the phosphorus, and practically all the potash used in the fertiliser trade is drawn from outside sources, but if it were economically advisable or necessary, the Dominion could provide for her needs at home. Subsidiary materials, such as sulphuric acid, gypsum, and other forms of lime, are staple home products.

The following is a resumé of all the materials at present known to exist in Canada as available for fertiliser, and a distinction will be drawn between these now active and those dormant or potential or neglected.

### Nitrogen

Leaving out of sight the nitrogen supplied by abundant rain and snow and the leguminous crops and barnyard manure common to every farming country, and also the local "mussel mud" of Prince Edward Island, the sediment deposits on dyked lands, and the sewage going to waste, the largest active sources of nitrogen in Canada now are four—namely, abattoir waste, fish and whale waste, ammonium sulphate from by-product ovens, and cyanamide from fixation of air. Abattoir products, including dried blood and tankage, are the only fertiliser materials produced between the western boundary of Ontario and the Rocky Mountains. The bulk of abattoir products is found in Ontario, as might be expected where a meat-eating population is denser, and where fertiliser is more in demand than elsewhere.

Of nineteen fish-waste and whale-products factories producing "fish guano" fifteen are on the Pacific coast of British Columbia. Most of these are dependent on the canned salmon industry for their supplies of offal, but the Consolidated Whaling Corporation has three whaling stations (on Queen Charlotte and Vancouver Islands), and there are various attempts to utilise the herring, dog-fish, and sharks that abound.

Conditions are different on the Atlantic coast. Though the number of fish-curing establishments in the maritime provinces is more than three times the number of those in British Columbia, there are only four factories for fertilisers. This is due to the separation of fish-curing depots at wide intervals along the coasts, as opposed to great concentration in British Columbia, to deep sea fishing as opposed to that at inlets and rivers' mouths, and to the considerable proportion of shell fish.

Taking the fish industry of Canada as a whole in relation to fertilisers, the figures available for 1920, indicate strikingly the neglect of fish-waste as a source of fertiliser. It can be seen that in New Brunswick and Quebec the only use made of fish as fertiliser was to dispose of 73,689 barrels of surplus fish for spreading on the land. The 930 canneries or fish-curing places (excepting the phosphatic material of bone meal, mainly from whales) produced on an average about one-half a ton each of nitrogenous fertiliser. Further evidence of the waste of fish meal as guano is found in the very large proportion of oil produced and sold, as compared with fertiliser material produced from the same source. What becomes of the by-products, whose value is so greatly increased by the extraction of the oil?

Seven plants produce ammonium sulphate, the chief of which are those of the British Empire Steel Corporation, in Nova Scotia; the smelters of the Granby Consolidated Smelting and Mining Company, Anyox, in British Columbia; the Algoma Steel Corporation at Sault Ste. Marie, Ontario; and the Steel Company of Canada, at Hamilton, Ontario. For Nova Scotia the chief market, besides the apple orchards of the Annapolis Valley, Nova Scotia, is the West Indies; for British Columbia, besides the orchard districts of the province, Hawaii, the Dutch East Indies, and Japan. Ontario producers have a market in the large fruit district of the Niagara peninsula. Small supplies of ammonium sulphate are also drawn from the lighting, heating, and power gas industries of Montreal and some other towns.

Of the processes for fixation of atmospheric nitrogen Canada furnishes two examples. The American Cyanamid Company, utilising the Niagara power, produces about 63,000 tons of cyanamid yearly, but the whole product is shipped to New York for treatment and sale. An arc process plant, utilising the Lake Buntzen power in British Columbia, has a capacity of 800 metric tons of nitrogen a year, but the final product is in the main sodium nitrite, and not in nitrate form.

Though the present active production of nitrogen is on the small scale indicated, Canada has reserves of power and material which will make her a factor in the market when the world's needs of nitrogen, which double every ten years, are pressing on supplies. The non-active reserves for nitrogen in descending order lie—(1) In the water powers with the requisite abundance of coal and lime; (2) in the extensive area of oil shales; (3) in the vast fields of lignite, bituminous coal, and peat.

\*From Raw Material Review, London.



### Phosphorus

Active production on any considerable scale is now confined to animal refuse, fish waste, and basic slag. What is produced apart from the bone ash and bone black of sugar refineries, beet sugar waste, brewers' waste, and apatite is insignificant.

Bone meal is a product of abattoirs and the whaling industry, and a percentage of phosphate is also found in the guano of fish waste. The location and character of these sources of supply have already been noted in connection with nitrogen. The third active supply is from basic slag. The general disuse of the Bessemer process in the manufacture of steel and the substitution of the basic open hearth process, with or without the use of fluorspar, has affected the amount of available phosphorus in the slag, and given rise to experimental work proving the value of the different types, the verdict being that if the purchaser considers the unit of phosphorus and the fineness of grinding, the value of each type is the same. Apart from a small importation (valued at \$18,000 in 1921) from the U. S. A., the slag used as fertiliser in Canada is produced at the blast furnaces in Nova Scotia and Ontario.

### Potash

Canada is estimated to consume annually 1,200 tons of actual potash ( $K_2O$ ), which is equivalent to about 6,000 tons of salts. Nearly all of this is imported from Germany, Alsace, and the United States. The breaking of the German monopoly by the restoration of Alsace to France and by the development of potash

resources in the United States during the war has been of great benefit to the consumer. The natural brines and deposits of Nebraska and California and the Alsatian mines are now rivals of the Stassfurt Syndicate in the potash market. This being the case, active potash production in Canada is merely a side issue, if we except the wood ashes exported for other than fertiliser purposes to the United States. Potash is recovered from fine dust in one or two cement plants and from blast furnace gases, and small amounts are still saved at the three beet sugar factories in Ontario and at certain distilleries. As a by-product of wool scouring, it is likely to increase now that the Co-operative Wool Growers are centralising the yield and a combing plant company is projected on similar lines.

### Sulphuric Acid

This is manufactured largely (1920, 73,000 tons) from the pyrites of iron and copper, which are widespread in Canada. Some is exported. Judging by United States statistics, 60 per cent. of the output is used in the fertiliser industry.

### Limestone, Marl and Gypsum

As needed for fixation processes of atmospheric nitrogen or for soil improvement, such as neutralisation of acids, development of useful bacteria, and general physical condition, limestone and marl deposits are widely distributed, except from western Manitoba to the Rocky Mountains. Gypsum, however, is found in northern Alberta.

## United States Coal Commission--Interim Report

*The United States Coal Commission has made an interim report to Congress, from which these salient paragraphs are taken. This report is of moment to Canadians not only because it affects the principal source of our coal supply but also because it describes conditions that prevail in Canada as well as in the United States.*

### The Public and Coal

The coal problem begins with a contradiction. Rich beyond all other nations in its wealth of coal resources, the United States experiences coal shortages and high prices. The coal deposits of the country are abundant and well distributed. Coal of every variety from anthracite to lignite underlies the hills and plains and mountains in beds whose content is measured by thousands of billions of tons, so that coal of a quality and in quantity that would be regarded as important by most other nations is found in all but thirteen States of the Union, and commercial mines are being operated in twenty-nine States.

Yet, with resources of coal in the ground adequate for the needs of perhaps a hundred generations of Americans, the nation's coal bin is too often depleted and too often the prices paid for coal are much higher than seem warranted by the wealth of coal available.

There have been during the last six years three periods when shortage in the supply of coal has given rise to acute national concern. These recurring periods of scarcity have increased the cost of this basic commodity—increases especially serious to domestic consumers, railroads, and public utilities. These experiences of unsatisfied demand and unsatisfactory prices have created in the popular mind a conviction that the natural benefits to be expected from a

condition of plenty have been denied through artificial interference. The coal industry, therefore, has been subjected to outspoken criticism, and public dissatisfaction has expressed itself in a series of investigations and in regulatory laws.

The Act creating the United States Coal Commission is an expression of this feeling of public concern and dissatisfaction.

### The Coal Industry

Every industry and every citizen throughout the country is directly or indirectly dependent upon coal. While it is true that a large majority of the States have coal mines within their limits, it is significant that all the anthracite comes from a narrow area of 480 square miles in eastern Pennsylvania and 93 per cent of the bituminous coal comes from three major areas: The Appalachian region, extending from Pennsylvania to Alabama, the greatest storehouse of high-rank coal in the world; the Eastern Interior, comprising Illinois, Indiana, and Western Kentucky; and the Western Interior region, extending from Iowa to Arkansas and Oklahoma. Any map showing the distribution of the larger industrial plants of the country would in itself demonstrate the part played by these coal fields in locating the great manufacturing centers and planning the network of railroads that connect the larger commercial cities with the rich agricultural lands of the West and South. Inasmuch as more than two-thirds of the country's supply of high-grade coal lies within these three great coal areas, they may well be regarded as its chief known sources of industrial power for future centuries. The coal problem of the country, so far as it relates to present production, then, is largely localized in three coal regions and about a dozen



States, although it is recognized that each mining district, large or small, has its problems to be investigated.

In reality the coal industry includes three interrelated industries—mining, transportation, and marketing.

The coal mining industry, in point of numbers employed, outranks any single manufacturing industry and stands next to transportation and agriculture. Approximately three quarters of a million men are employed in this industry, of whom 90 per cent work underground.

The capital invested, according to the rough figures of the census, is \$2,330,000,000 of which \$430,000,000 is invested in the anthracite region and the remainder in the bituminous fields. There are only 174 producers of anthracite and 8 of these control over 70 per cent of the annual output, while there are at least 6,000 commercial producers of soft coal, to say nothing of thousands of wagon mines and country coal banks. These producers operate 9,000 commercial mines.

While the anthracite and bituminous branches of the coal industry are to some degree competitive in their markets, the differences in their mining, labor, and economic problems are so marked that the discussion in this report will be limited to bituminous coal except where anthracite is specifically mentioned; the law requires a "separate report on the anthracite industry on or before July 1, 1923."

Each coal district, if not each mine, has its own local customs and problems, determined by the quality of coal, thickness of seam, attitude of the bed, conditions of mining, the markets which it can reach, its freight rates, its labor policy and other factors. In the matter of wage scales, even in the union districts where wage scales are determined by joint agreement, we find variations from district to district and from mine to mine. Still more difficult to summarize are the wage rates in non-union mines. Not only are these wage rates complicated, but the opportunity to labor varies so greatly from field to field or mine to mine, depending on character of coal, nearness to the market, and commercial connections; that it is hazardous to make any generalization concerning miners' earnings.

No less difficult under such conditions is the determination of average cost or profit. These subjects require specific and very detailed, painstaking investigation, which is complicated by the varying prices charged and received for the coal, quantity and quality both entering into the subject. The bituminous output is consumed approximately in the following percentages: Railroads; 28; Industrials, 25; Coking, 15; Domestic, 10; Iron and Steel, 7; Public Utilities, 7; Export, 4; Mines, 2; Bunkers, 2.

The coal industry does not end at the mine. Some 180 railroads take the coal at the mine mouth and transport it to thousands of destinations. Because the railroads are the largest customers of the bituminous industry, and because coal—anthracite and bituminous—constitutes one-third of the railroad's freight the problems of the two are closely interwoven and their interests interdependent. Not only does irregularity in coal output mean serious fluctuations in revenue but excessive irregularity imposes impossible traffic demands on the railroads. On the other hand, interference with rail transportation means a corresponding stoppage of output for the mines and shortage of fuel for the consumer. No solution of the coal problem can be found that does not recognize this community of interest between coal and transportation. But this community of interest, though simply stated, is not simple upon examination. The movement of coal by rail and water is complicated by variations in freight rates, arbitrary differentials, and competition between different coals and between carriers.

Nor does the coal industry end with transportation. To connect the thousands of producers, big and little, with more than 90,000 buyers of carload lot coal scattered over

48 States, requires a widespread system of wholesale marketing. Sometimes this marketing is reduced to the simplest terms, as when a steel plant or railroad buys a mine and consumes its entire output. Sometimes it is conducted by the selling department of a large operating company. Sometimes the task of bringing together producer and consumer is performed by an independent wholesaler or selling agent. There are some hundreds of large wholesalers and a much greater number, perhaps 3,500 in all, of smaller middlemen. Like the business of running mines, the business of selling has its problems and, like mining, it has also its abuses.

The final link in the chain of coal supply is the retailer, who receives coal in carload lots from car or yard storage and delivers it in smaller quantities to the consumer. There are some 38,000 retail coal dealers, most of them conducting a small business. They handle about 130,000,000 tons of coal, or 14 per cent of the bituminous and two-thirds of the anthracite produced.

Combined charges of the railroad, the wholesaler, and the retailer in most localities exceed the price of the coal at the mines. Therefore it is readily seen that the problem whether the transportation and marketing charges are just and fair is of the utmost concern to the consumers of coal.

#### *Deficiencies in Service*

The widespread public dissatisfaction with the service rendered by the coal industry is not confined to matters of shortage and price, for a train of unfortunate consequences has followed those recurring periods of scarcity; deterioration in the quality of fuel delivered; congestion of railway traffic, necessitating the neglect of other freight to give preference to coal, to the serious harm of other business; and breakdown of mutual confidence of producers and consumers of coal as expressed in the customary contractual relations.

How many there are we do not yet know, but there are certain mines which contract a part of their potential output, reserving the balance for spot coal. These operators guard themselves against car shortage by clauses which compel them to fill their contracts only in proportion to the relative car supply. So in recent years, when speculators with contracts could get only a partial supply of cars, say 60 per cent, they would use only that percentage of available cars for deliveries upon their contracts, while the other cars would be used for spot coal; that is, they prorate their contracts with the sole purpose of having free coal for a higher spot market.

The record of production and distribution of coal in recent years may be summed up in the word "instability," and this instability in the supply of one of the most fundamental of all raw materials has been an important cause in unsettling business and in delaying the return of normal times.

1. *Large Profits.* It has been suggested to us that one of the causes of high prices of coal is profiteering. There has been profiteering in the sense that grossly exorbitant profits have been taken at times by many operators, brokers, and retailers; profits that have been disproportionate to the cost of the coal or the service rendered or the risk incurred.

But this Commission has not yet obtained the figures for the past ten-year period specifically required by the Act in order to settle this question. A thorough examination of the profits of production and distribution, including the revenue derived from associated enterprises, is already under way.

2. *Labor Difficulties.* Others attribute the instability in the coal industry primarily to labor troubles.

There can be no doubt that two of the three periods of high prices since 1916 have been caused largely by labor



troubles. In the first period of scarcity—August, 1916 to March, 1918,—there were no strikes of consequence and therefore some other explanation of the high prices and distress must be found.

3. *Car Shortage.* An opinion commonly expressed before the Commission is that the primary cause of scarcity and high prices of coal is transportation deficiency.

There have been recurring periods of "car shortage," and such periods have generally been accompanied by high prices of coal. There are many other causes for the inadequacy of transportation beside the absence of cars, such as lack of motive power, congestion of yards, terminal facilities, or gateways, single tracks where double tracks are needed, inability to co-ordinate movement of boats and cars at ports, strikes of railway labor, and severe winter storms temporarily blocking traffic. Any of these elements may be responsible for what to the operator at a mine seems a simple "shortage of cars."

4. *Overdevelopment.* Already in our study we have come to see that underlying these immediate causes of scarcity and high prices—labor difficulties and transportation deficiency—are other causes; namely, the irregularity of demand and the overdevelopment of the mining industry. These basic factors apply directly only to bituminous coal but indirectly they affect anthracite as well, for anthracite is in competition with bituminous coal and the wage scale in the one industry is influenced by changes in the other.

We find that in the bituminous industry since 1890 the mines have averaged, over the country as a whole, only 213 days out of a possible working year of 308 days. These averages, of course, show nothing as to the relative earnings of individual miners or their individual opportunity to work. In 1920, a year of active demand, the average time worked was only 220 days, and in 1921, the year of depression, it dropped to 149 days, with many districts showing a figure much below this average. Over a long period comparatively little of the time lost has been on account of strikes and that in the years when there are no strikes the aggregate time lost from all causes is about as great as in those when strikes occur. In the twenty-three years over which the statistical record of strikes extends, the time lost because of strikes has averaged 9 days a year, or less than 10 per cent of the time lost for all causes combined.

The steady increase in the army of bituminous coal miners during the last four years, notwithstanding a lessened demand for their product is also a fact that stands out in the statistical records furnished the Commission by the U. S. Geological Survey. In 1918, the year of maximum coal output, when 579,000,000 tons were mined, 615,000 men were employed in the bituminous coal mines, nearly 622,000 the next year, over 639,000 in 1920, and in 1921, 663,000 mine workers were employed in producing about 416,000,000 tons. To get a year comparable in soft coal output with 1921 we have to go back to 1910, when 417,000,000 tons were mined, and it is significant that in that year less than 556,000 mine workers were employed—or about a million more tons of coal with 100,000 fewer miners.

This condition of overdevelopment in mines and of surplus number of miners is an underlying cause of the instability of the industry. It means unemployment and intermittent employment to the coal miner and a direct loss of him of earning power. It explains his need and demand for a day wage rate higher than the average for most other industries. It has also adversely affected the profits of the operator and imposed a burden on the consumer.

The seasonal character of coal movement is a serious handicap to the railroads in those districts where it is the rule. If the peak demands of the mines are to be met the carrier must provide equipment for which there is no use in the off-season.

5. *Coal Storage.* A preliminary survey indicates that much can be done to overcome irregular demand by encouraging the storage of coal, and the Commission cannot stress too strongly the great advantages of coal storage during the spring and summer for fall and winter use. This recommendation should apply to all consumers of coal—the railroads, the public utilities, the industries, and the home—and on the measure in which it may be adopted will largely depend the evenness of distribution and the cost of coal to the public during the season of heavy consumption. In addition, it will contribute to more continuous operation of the mines during the summer, distributing employment more evenly throughout the year, thus tending to stabilize the industry. Coal storage, generally adopted by the consumer, large and small, would benefit the carrier systems of the country by equalizing their load. It should have the effect of reducing the price of coal to the consumer.

\* \* \*

There can be no satisfactory agreement as to wage rates and no lasting peace between operators and men unless steadier employment can be provided. There can be no satisfactory solution of our transportation problem as long as the railroads are subjected to sudden peak loads of coal traffic at the season when the demands of agriculture and industry are at their height.

The Commission believes that the public interest in coal raises fundamental questions of the relation of this industry to the nation and of the degree to which private right must yield to public welfare. It may be that both private property in an exhaustible resource and labor in a public service industry must submit to certain modifications of their private rights, receiving in return certain guarantees and privileges not accorded to purely private business or persons in private employ.

#### SYNTHETIC KEROSENE FUEL.

The solution of still another industrial problem has been undertaken at the research laboratories of Carnegie Institute of Technology, Pittsburgh, in experiments to determine the relative efficiency of kerosenes and oxidized kerosenes as fuels.

In accordance with the policy of the Institute to link up its educational facilities with modern industry, the Department of Chemical Engineering has been conducting a series of tests to determine the relative merits of various oils as usable fuels. The completion of this important work should go a long way toward solving the problem of oil conservation, by the possible development of a new fuel.

According to a report by Dr. J. H. James, Head of the Department conducting the experiments, oxidized kerosenes cause less "knocking" tendencies than straight kerosene when used in a kerosene engine. The tests also showed that oxidized kerosenes have approximately the same power development as ordinary kerosene, in spite of the fact that their thermal value is one-eighth less. Dr. James attributes the efficiency of the oxidized kerosenes to the better "clean up" in the combustion of these partially oxidized fuels.

The success of the experimental work at Carnegie at this stage gives promise that oxidized kerosene, which is manufactured by catalytic oxidation from low-grade petroleum, may become a useful fuel in the future. Its properties may cause it to be used industrially in kerosene engines or blended with gasoline for use in gasoline engines. Although it has a somewhat lower fuel value than ordinary kerosene, one of the most favorable features of its effectiveness is that it undergoes much better combustion in the internal combustion engine.



# The Mining Districts

BY THE JOURNAL'S CORRESPONDENTS

## NORTHERN ONTARIO

**COBALT.**—During the month of December the Nipissing mined ore of an estimated net value of \$279,000 and shipped bullion of an estimated net value of \$262,000. Silver was valued at 65 cents per ounce. The low-grade mill treated 6,958 tons and the high-grade plant only treated 95 tons, as it was shut down on December 15th. for the annual clean-up. The refinery shipped 405,297 fine ounces of bullion. During the year 1922 production is estimated at 3,350,000 ounces, worth \$2,265,000, which is the largest annual production in the last four years. Production of cobalt metal amounted to 365,000 pounds. The shipments during the year amounted to 3,682,815 fine ounces of bullion, and 2,961 tons of residues, estimated to contain 181,470 ounces of silver and 398,000 pounds of cobalt. Underground development has been satisfactory and some new ore has been discovered.

During the month of November the Mining Corporation treated 8,687 tons and produced 92,215 ounces of silver. Costs at the mine were \$49,409. The company has recently located some small bodies of milling ore on the Farah property, which it has under lease. It is also understood that encouraging results have been met with on the Lightning River properties, which the Mining Corporation has had under option for some time. So far work has been confined to surface trenching, but diamond-drilling will be resorted to in an effort to prove the ore bodies.

During the week ending January 5th the O'Brien was the only shipper from Cobalt, with one car containing 64,000 pounds.

The Casey Mountain Operating Syndicate will rebuild the plant and buildings destroyed by the big fire last October. The property is close to the Casey Cobalt Mine, north of Lake Temiskaming, which had a large production.

A few days ago the McKinley-Darragh office and warehouse were completely destroyed by fire. The company will not re-build, as other buildings can be used. The company's production for 1922 amounted to approximately 300,000 ounces, and it is understood that a substantial profit was made. The year's operations have disclosed a larger tonnage of good milling rock than was expected.

The Colonial shaft is now down over 700 feet and the company expects to reach the required depth by the end of February. The Violet shaft, in the same neighborhood, is down 150 feet and good progress is being made.

**KIRKLAND.**—The most important mining news of the past several months is the announcement that the negotiations for the taking over of the Orr property by the Teck-Hughes have been finally concluded. Rumors of deals have been reported for the past couple of years, and when arrangements were finally concluded people were rather taken by surprise, as very little has been heard of the matter lately. It is proposed to increase the capital of the Teck-Hughes to \$5,000,000, and to issue 600,000 shares for the Orr property. The purchase of the Orr is important to the Teck-Hughes, because

the main vein of the Teck-Hughes crosses a corner of the former property. Considerable development was done on the Orr, and at the 400-foot level it is stated that a length of 400 feet of ore was developed and that reserves are in the neighborhood of \$2,000,000. The property consists of 9 claims, totalling 276 acres, of which 84 acres adjoin the Teck-Hughes on the south. The Orr Gold Mine, Limited, has a capital of 2,000,000 shares, of which C. A. Wettlaufer of Buffalo owned 1,019,334 shares and Hamilton B. Wills, 730,030 shares.

A break-down of the Bidgood compressor has resulted in a stoppage of work until repairs have been made. It is understood that to date the company has found three small ore-shoots, which are not of sufficient size to justify a mill.

On the Canadian Kirkland property lateral work has been started on the 400-foot level.

At the Kirkland Gold a new vein has been found on the 800-foot level and to date development has opened up an ore-shoot 175 feet in length, which runs between \$10.00 and \$12.00 over a commercial width. This new vein has been found some distance to the north of the main break, along which all the previous development has been carried on. The ore-body lies in the porphyry and crosscuts are now being driven on the 700-foot and 900-foot levels to determine the vertical extension of the ore.

**BOSTON CREEK.**—It is announced that a new vein has been cut on the 100-foot level of the Baldwin property, which shows high-grade ore in places. Drifting has been started and it is understood that encouraging results are being encountered.

To satisfy judgment secured against the Murray-Mogridge Mines, Limited, the properties of the company will be put up at sheriff's sale in New Liskeard on January 30th.

**PORCUPINE.**—A preliminary statement of the Dome for the year 1922 shows a production of \$4,160,000 from 368,000 tons, an average of \$11.28 a ton. This shows a very substantial increase over 1921, when the production amounted to \$2,240,000. During December 33,500 tons were treated, and a recovery of \$361,000 was made, an average of \$10.88 a ton.

The vein recently cut on the 733-foot level of the Vipond is showing a substantial body of ore. To date 100 feet of drifting has been done and the ore averages better than \$11.00 across a stoping width. On the 1000-foot level a crosscut is being driven north to intersect the extension of one of the Hollinger veins.

## BRITISH COLUMBIA

**CEDAR CREEK.**—Speaking before the Vancouver Island Prospectors' Association, J. D. Galloway, government mining engineer for the Cariboo and other northern provincial districts, said the Cedar Creek field, newly discovered, would yield largely next season if proper weather conditions were met with. He put the production of the past year from that section at \$100,000. This was recovered almost entirely by the use of rockers. Mining on three separate claims had by test shown values



in the pay gravel of from \$25 to \$600 per cubic yard. When news of the discovery was first circulated it was much exaggerated. Stories were told of nuggets being found in vast quantities, almost for the labour of picking them up, and how millions of dollar worth of gold were in sight. Many people had gone into the district, failed to find easy gold or to secure a claim showing pay, and had come out with the report that the field was a fake.

Mr. Galloway discussed the placer gold possibilities of the Cariboo generally. He said that keystone drill tests made recently by the government had proved the suitability of the field for dredging. The high-grade gravels had been pretty thoroughly worked by the old prospectors, but large quantities of low-grade material existed. The same held true of other old-time placer fields and he was convinced that within a short space of time several big dredging companies would be operating in various parts of the Province.

**PORTLAND CANAL.**—A five-foot shoot of high-grade ore has been uncovered on the Fish Mine of the American Mining & Milling Co. from which returns have been obtained of \$107 to the ton. Fish Creek is in the Salmon River Valley, Portland Canal District.

The Premier Gold Mining Co. is reported to have maintained an average output of 300 tons a day throughout the past year, making a total for the twelve months of approximately 110,000 tons. High-grade material is sent to the Tacoma Smelter, the medium to the Anyox Smelter, and the low is run through the company's concentrator at the mine. Since the commencement of its operation, the eleven-mile aerial tram has been giving entire satisfaction. A continuous run of ore-carriers has been necessary to keep the ore bunkers at Stewart clear. In order to facilitate this a new steamer has been put in commission. The Company has had approximately 250 men on its pay roll throughout the year. It is stated that, in addition to its original claims, it now owns, controls or is interested in some fifty or sixty claims in the Salmon River Valley.

**HAZELTON.**—J. F. Duthie, of Seattle Wn., who has been developing some claims situated on Hudson Bay Mountain, near Hazelton, seems satisfied with his interests. He states that, if present indications work out logically, there is a mine in the making that will make the Premier look small. The showings are said to be similar to some of the silver deposits of Nevada and Mr. Duthie can produce assays of ore taken from a high-grade vein running as high as \$507 to the ton. The property does not depend on this, however, there being some low-grade veins giving returns of about \$15 to the ton. The high-grade ore is described as being rather like that of the Premier Mine, but without gold values. The values are said to increase with depth instead of pinching out as had been prophesied. The property is situated on the mountain-side about 1900 feet above the town of Smithers. A survey of the route for an aerial tramway to carry the ore to the railway has been completed and the construction work will start soon. Several carloads of ore have been sent to the Trail Smelter.

**OPTIMISTIC VIEW OF 1923.**—Valentine Quinn, controller of the Granby Consolidated Mining & Smelting Co., is quoted in an optimistic vein with reference to the prospects for mining development in British Columbia during 1923. "While much of the development work is under cover at present and it is, therefore, taboo to discuss it", he says, "it is now beyond doubt that the coming season will prove to be one of unexampled prosperity and development throughout the vast areas of this

province will proceed apace. From the coal fields of Fernie; from Trail, with its 2500 employees and its \$13,000,000 yearly output; from the Nelson District; and from Hedley and Princeton in the interior; Britannia Beach, Cariboo, Vancouver Island, Surf Inlet, Anyox, Stewart and the new mining areas contiguous to the Canadian Northern Ry., come reports of continuation, resumption and expansion of operations. Larger quantities of supplies will be required, more men will be engaged, and more extensive construction operations will be carried on in the mining industry than for a long time past."

**1922 RECORD FOR TRAIL SMELTER.**—A production of lead, which is over double the lead values produced in any previous year, is one of the features of the work of the Trail Smelter, Consolidated Mining & Smelting Co., during 1922. The smelter's output has climbed in quantity from 26,000,000 pounds in 1920 to 84,000,000 pounds in 1922, more than trebling within two years. Another noteworthy fact is that zinc production at Trail has increased in value over \$500,000. Silver, too, has increased 63 per cent in quantity and over \$500,000 in value. Notwithstanding that the production of gold and copper by the Company has sunk to negligible quantities through the closing down of the Rossland Mines and of the copper plant at Trail, the total value of metals produced for 1922 is 33 per cent. better than 1921 and 24 per cent. higher than that for 1920.

Final statistic of ore receipts at the Trail Smelter during the past year show that the total for 1921 was exceeded by 115 tons. During the last ten days of the month of December 11,343 tons were received. As the tonnage for 1921 was the largest for any year in the Company's history up to that time, the aggregate for 1922 creates a new record. A tonnage of 30,334 from custom mines, against 9,480 during 1921, strikingly tells the story of the renewed activity of independent operators. Of 50 shipping mines of the Slocan, including Ainsworth district, the Silversmith was the leader with 6831 tons of lead and zinc concentrate. The Standard at Silverton shipped 2496 tons, principally zinc, and the Bosun, at New Denver, 1240 tons. Five Washington State mines also went into four figures in point of ore shipments.

The tonnage of the Consolidated Company's properties dropped in 1922, as compared with the previous year, from 402,132 to 381,393 tons. This is due to the copper properties having been closed down until the new concentrator at Kimberley is constructed. The Sullivan Mine, of course, is the large shipper of the Kootenays.

#### UNITED STATES OUTPUT OF COPPER INCREASES IN 1922.

The smelter production of copper in 1922, according to the United States Geological Survey, as compiled from reports of the smelters covering the actual production for 11 months and the estimated production in December, was about 981,000,000 pounds, an increase of 475,000,000 pounds over 1921. Productive work was resumed by practically all the large mining companies except the United Verde Copper Co. by or during April, 1922, one year from the general shutdown of the copper mines. The smelter production of copper for December, as estimated by the producing companies, was 103,300,000 pounds, or at the rate of about 1,240,000,000 pounds a year.

The total production of new refined copper from domestic sources, determined in the same manner as the



smelter production was about 897,000,000 pounds, 88,000,000 pounds more than in 1921. The refinery production of new copper obtained from domestic and foreign sources, including the imports of refined copper, was about 1,328,000,000 pounds. In addition to the output of new refined copper about 112,000,000 pounds of secondary copper was produced at the refineries, making the total output of the refineries about 1,500,000,000 pounds.

Although the new tariff act placed no duty on copper, it affected the records of the Department of Commerce, in which a line of division was drawn on September 21, when the new tariff became effective. Up to that date the total imports of copper in ore, concentrates, matte, blister, and refined copper amounted to 309,445,226 pounds, of which 75,556,317 pounds was refined copper and 192,050,397 pounds was blister copper. The exports for the first ten months amounted to 634,501,851 pounds. The figures for later imports will not be available until January 15, 1923, but those for later exports will be available somewhat sooner.

The stocks of refined copper in the hands of domestic refineries on December 31, 1922, as estimated by the refining companies, were about 277,000,000 pounds, compared with 459,000,000 pounds on December 31, 1921. The stocks of blister copper and material in process of refining, in the hands of the smelters, in transit to refineries, and at refineries, on December 31, 1922, were estimated by refining and smelting companies at about 352,000,000 pounds, compared with 283,000,000 pounds on December 31, 1921.

The quantity of primary refined copper withdrawn on domestic account during the year was about 882,000,000 pounds, calculated as follows:

|                                                                                                                                         | 1921          | 1922          |
|-----------------------------------------------------------------------------------------------------------------------------------------|---------------|---------------|
| Refinery production from domestic sources                                                                                               | 609,000,000   | 897,000,000   |
| Refinery production from foreign sources, including estimated imports of refined copper                                                 | 411,000,000   | 501,000,000   |
| Stocks of new refined copper Jan. 1                                                                                                     | 659,000,000   | 459,000,000   |
|                                                                                                                                         | 1,679,000,000 | 1,857,000,000 |
| Exports, including unrefined black blister and converter copper in bars, pigs, and other forms, and refined in ingots, bars, rods, etc. | 609,000,000   | 698,000,000   |
| Stocks December 31                                                                                                                      | 459,000,000   | 277,000,000   |
|                                                                                                                                         | 1,068,000,000 | 975,000,000   |
| Total withdrawn on domestic account                                                                                                     | 611,000,000   | 882,000,000   |

Canadian water-power is a potent factor in metallurgical industry for the manufacture of aluminum, phosphorus, calcium carbide, carborundum, cyanamid, caustic soda, chlorine, sodium, chlorate, and artificial graphite, to mention some of its products. It is used to a large extent to supply power for mining and refineries whilst its prospective use for smelting and synthetic fertilizers promises an even wider field.

According to the New York World, eight hundred and seventy-five million fine ounces of gold, valued at \$18,000,000,000, have been produced by the world since Columbus discovered America. About \$8,000,000,000 is in circulation as money or in the banks and public treasuries of the world, \$2,000,000,000 of which is in the United States Treasury. The other \$10,000,000,000 worth of gold has been used up in the industrial arts or has disappeared in the 430 years since the keeping of accurate gold statistics began.

## INDEX TO MINE AND MILL SUPPLIES

Addresses of advertisers whose names appear in the following classified index, may be found upon reference to their advertisements. An alphabetical index to advertisers will be found on the page facing the inside back cover. The following regulations apply to all advertisers:—One-eighth page, every issue, three headings; one-quarter page, every issue, six headings; one half page, every issue, six headings; one half page, every issue, twelve headings; full page, every issue, twenty-four headings. Buyers who are unable to find in the classification heregiven such machinery or supplies as they desire are invited to write Service Dept., Canadian Mining Journal, Gardenvale, Que., who can in all probability, refer them to proper sources.

**Acetylene Gas:**  
Pres-O-Lite Co. of Canada, Ltd.

**Agitators:**  
The Dorr Co.  
Horton Steel Works, Limited.

**Air Compressors:**  
Belliss & Morcom Ltd.  
Canadian Ingersoll-Rand Co., Ltd.  
Denver Rock Drill Mfg. Co., Ltd.  
Herbert, Alfred, Limited  
Holman Bros., Ltd.  
Laurie & Lamb.  
Sullivan Machinery.

**Air Hoists:**  
Canadian Ingersoll-Rand Co. Ltd.  
Denver Rock Drill Mfg. Co.  
Herbert, Alfred, Limited.  
Holman Bros., Ltd.

**Air Receivers:**  
Canadian Ingersoll-Rand Co., Ltd.

**Alloy & Carbon Tool Steel:**  
Peacock Bros., Ltd.

**Amalgamators:**  
Mine & Smelter Supply Co.

**Asbestos:**  
Everitt & Co.

**Asst. Handling Machinery:**  
Canadian Link-Belt Co., Ltd.  
Canadian Mead-Morrison Co.

**Assayers and Chemists:**  
Ledoux & Co.  
Thos. Heyes & Son.

**Assayers and Chemists' Supplies:**  
Mans, Limited.  
Mine & Smelter Supply Co.

**Balls:**  
Hebert, Alfred, Limited  
Holman Bros., Ltd.  
Hull Iron & Steel Foundries, Ltd.  
Peacock Brothers, Limited.  
The William Kennedy & Sons, Ltd.

**Ball Mills:**  
Herbert, Alfred, Limited.  
Holman Bros., Ltd.  
Hull Iron & Steel Foundries, Ltd.  
Mine & Smelter Supply.

**Ball Mill Feeders:**  
Herbert, Alfred, Limited.  
Holman Bros., Ltd.  
Hull Iron & Smelter Supply.  
Mine & Smelter Supply.

**Ball Mill Linings:**  
Canadian Steel Foundries, Ltd.  
The William Kennedy & Sons, Ltd.  
Peacock Bros., Ltd.  
Hull Iron & Steel Foundries, Ltd.  
Mine & Smelter Supply.

**Balances — Assay & Analytical:**  
Mine & Smelter Supply.

**Belting — Leather, Rubber & Cotton:**  
Canadian Link-Belt Co., Ltd.  
Jones & Glassco (Regd.).

**Belting:**  
Gutta Percha & Rubber, Ltd.

**Belting — Silent Chain:**  
Canadian Link-Belt Co., Ltd.  
Hans Renold of Canada, Ltd.  
Jones & Glassco (Regd.).

**Belting (Conveyor):**  
Gutta Percha & Rubber, Ltd.  
Dunlop Tire & Rubber Co., Ltd.

**Bins & Hoppers:**  
Can. Chicago Bridge & Iron Co., Ltd.  
Horton Steel Works, Ltd.  
The William Kennedy & Sons, Ltd.

**Bluestone:**  
The Consol'd Mining & Smelting Co.

**Boilers:**  
The William Kennedy & Sons, Ltd.

**Boxes, Cable Junction:**  
Standard Underground Cable Co. of Canada, Ltd.  
Northern Electric Co., Ltd.

**Buggies, Mine Car (Steel):**  
Hendrick Manufacturing Co.  
Herbert, Alfred, Limited.  
Holman Bros., Ltd.

**Brazilian Ballas:**  
Diamond Drill Carbon Co.

**Brick:**  
Wettlaufer Bros.

**Bronze, Manganese, Perforated & Plain:**  
Hendrick Manufacturing Co.

**Buckets:**  
Canadian Ingersoll-Rand Co., Ltd.  
Canadian Link-Belt Co. Ltd.  
Hadfields, Limited.  
Hendrick Manufacturing Co.  
Herbert, Alfred, Limited.  
Holman Bros., Ltd.  
The William Kennedy & Sons, Ltd.  
Peacock Bros., Ltd.

**Bucket Lips:**  
Canadian Steel Foundries, Ltd.  
The William Kennedy & Sons, Ltd.

**Cable — Aerial and Underground:**  
Canada Wire & Cable Co.  
Standard Underground Cable Co. of Canada Ltd.  
Peacock Brothers, Limited.

**Dredging Ropes:**

Allan Whyte & Co.  
Greening, B., Wire Co., Ltd.

**Drills, Air and Hammer:**

Canadian Ingersoll-Rand Co., Ltd.  
Canadian Rock Drill Co.  
Denver Rock Drill Mfg. Co., Ltd.  
Herbert, Alfred, Limited  
Holman Bros., Ltd.  
Sullivan Machinery Co.  
The Mine & Smelter Supply Co.

**Drills—Core:**

Canadian Ingersoll-Rand Co., Ltd.  
Herbert, Alfred, Limited  
Holman Bros., Ltd.  
Sullivan Machinery Co.

**Drill Steel Furnaces:**

Canadian Ingersoll-Rand Co., Ltd.  
Denver Rock Drill Mfg. Co.  
Herbert, Alfred, Limited  
Holman Bros., Ltd.  
Sullivan Machinery Co.

**Drills—Diamond:**

Sullivan Machinery Co.

**Drill Steel—Mining:**

Canadian Ingersoll-Rand Co., Ltd.  
Hadfields, Limited  
Mussens, Limited

**Drill Steel Sharpeners:**

Canadian Ingersoll-Rand Co., Ltd.

**Electric Condensers:**

Griswold & Co.  
Canadian Rock Drill Co.  
Denver Rock Drill Mfg. Co., Ltd.  
Herbert, Alfred, Limited  
Holman Bros., Ltd.  
Northern Canada Supply Co.

**Drills—Electric:**

Herbert, Alfred, Limited  
Holman Bros., Ltd.  
Sullivan Machinery Co.  
Northern Electric Co., Ltd.

**Drills—High Speed and Carbon:**

Hadfields, Limited  
Herbert, Alfred, Limited  
Holman Bros., Ltd.

**Ejectors:**

Canadian Ingersoll-Rand Co., Ltd.

**Electric Hoists:**

Canadian Mead-Morrison Co.

**Elevators:**

Canadian Link-Belt Co., Ltd.  
Sullivan Machinery Co.  
Northern Canada Supply Co.  
Hadfields, Limited  
Jones & Glassco (Regd.).

**Engineering Instruments:**

Laurie & Lamb.  
C. L. Berger & Sons.

**Oil Engines:**

Canadian Ingersoll-Rand Co., Ltd.

**Engines:**

Canadian Sirrocco Co., Ltd.

**Engines—Gas and Gasoline:**

Sullivan Machinery Co.  
Gould, Shapely & Muir Co., Ltd.  
Laurie & Lamb.  
The Mine & Smelter Supply Co.

**Engines—Haulage:**

Canadian Ingersoll-Rand Co., Ltd.

**Engines—Steam:**

Canadian Ingersoll-Rand Co., Ltd.  
Laurie & Lamb.

**Engineers:**

Coyne, Alfred F. A.  
Dresser, John A.  
Door Co.  
Ferrier, W. F.  
Hore, R. E.  
Heves & Sons, Thos.  
Hersey Co., Ltd. Milton  
McEvoy, James C.  
Rogers, George R.  
Ross, Jas. G.  
Stewart, Robert H.  
Tyrrell, J. B.  
Whitman, Alfred B.  
Wilson, Ridgway R.

**Exhauster:**

Canadian Sirrocco Co., Ltd.

**Ferro-Alloys (all Classes):**

Canadian Steel Foundries, Ltd.  
Canadian Steel Foundries, Ltd.  
Everitt & Co.

**Fire Fighting Supplies:**

Gutta Percha & Rubber, Ltd.

**Flood Lamps:**

Northern Electric Co., Ltd.

**Flotation Oil:**

Hercules Powder Co.

**Flourspar:**

Consolidated Mining & Smelting Co.  
Everitt & Co.

**Forging:**

Canada Foundry & Forging, Ltd.

Herbert, Alfred, Limited  
Holman Bros., Ltd.  
Hull Iron & Steel Foundries, Ltd.  
Smart-Turner Machine Co.

**Coal Screening Plants:**

Canadian Link-Belt Co., Ltd.  
Canadian Mead-Morrison Co.

**Cobalt Oxide:**

Everitt & Co.

**Compressors—Air:**

Bellis & Morcom, Ltd.  
Canadian Ingersoll-Rand Co., Ltd.  
Denver Rock Drill Mfg. Co.  
Herbert, Alfred, Limited  
Holman Bros., Ltd.  
Laurie & Lamb.  
Smart-Turner Machine Co.  
Peacock Brothers, Limited.

**Concrete Mixers:**

Gould, Shapely & Muir Co., Ltd.

**Condensers:**

Canadian Ingersoll-Rand Co., Ltd.  
Smart-Turner Machine Co.  
Belliss & Morcom, Ltd.  
Laurie & Lamb.  
Peacock Brothers, Ltd.

**Concentrating Tables:**

Herbert, Alfred, Limited  
Holman Bros., Ltd.  
The Mine & Smelter Supply Co.

**Condensers—Electrical Static & Power:**

Griswold & Co.

**Consulters and Engineers:**

Milton Hersey Co., Ltd.

**Conveyors:**

Canadian Link-Belt Co., Ltd.  
Canadian Mead-Morrison Co.  
Jones & Glassco (Regd.).

**Conveyor Belts:**

Gutta Percha and Rubber, Ltd.

**Conveyor Flights:**

Canadian Link-Belt Co., Ltd.

**Conveyor—Trough—Belt:**

Canadian Link-Belt Co., Ltd.  
Hendrick Mfg. Co.  
Jones & Glassco, Regd.

**Copper:**

Consolidated Mining & Smelting Co.

**Couplings:**

Hans Renold of Can., Ltd.

**Cranes:**

Canadian Link-Belt Co., Ltd.  
Canadian Mead-Morrison Co.  
Peacock Brothers, Limited  
Smart-Turner Machine Co.

**Crane Ropes:**

Allan Whyte & Co.  
Canada Wire & Cable Co.  
Greening, B., Wire Co., Ltd.

**Crucibles:**

The Mine & Smelter Supply Co.

**Crusher Balls:**

Canada Foundries & Forgings, Ltd.  
Herbert, Alfred, Limited  
Holman Bros., Ltd.  
Hull Iron & Steel Foundries, Ltd.  
Peacock Brothers, Limited  
The William Kennedy & Sons, Ltd.

**Crushers:**

Canadian Ingersoll-Rand Co., Ltd.  
Herbert, Alfred, Limited  
Holman Bros., Ltd.  
Hull Iron & Steel Foundries, Ltd.  
Wettlaufer Bros.  
Lyman, Limited  
The Mine & Smelter Supply Co.  
Hadfields, Limited

**Cut Gears:**

Hans Renold of Can., Ltd.  
Jones & Glassco, Regd.  
The William Kennedy & Sons, Ltd.

**Cyanide:****Cyanide Plant Equipment:**

The Door Co.  
The Mine & Smelter Supply Co.

**Derricks:**

Smart-Turner Machine Co.

**Diamond Drill Contractors:**

Smith & Turner  
Sullivan Machinery Co.

**Digesters:**

Can Chicago Bridge & Iron Co., Ltd.  
Horton Steel Works, Ltd.

**Diesel Engines:**

Bellis & Morcom, Ltd.  
Laurie & Lamb.

**Dies:**

Canada Foundries & Forgings, Ltd.  
Herbert, Alfred, Limited  
Hull Iron & Steel Foundries, Ltd.  
Holman Bros., Ltd.

**Drain Tile:**

Wettlaufer Brothers.

**Dredges:**

Canadian Mead-Morrison Co.

**Dredger Pins:**

Hull Iron & Steel Foundries, Ltd.

**Dredging Machinery:**

Hadfields, Limited  
Hull Iron & Steel Foundries Ltd.

**Cages:**

Canadian Ingersoll-Rand Co., Ltd.  
The Mine & Smelter Supply Co.  
Herbert, Alfred, Limited.  
Holman, Ltd.  
The William Kennedy & Sons, Ltd.

**Cables—Wire:**

Standard Underground Cable Co. Ltd.  
Canada Wire & Cable Co.

**Cable Railway Systems:**

Canada Wire & Cable Co.

**Cam Shafts:**

Canada Foundries & Forgings, Ltd.  
Herbert, Alfred, Limited  
Holman Bros., Ltd.  
Hull Iron & Steel Foundries, Ltd.  
Peacock Brothers, Ltd.  
The William Kennedy & Sons, Ltd.

**Car Dumps:**

Canadian Mead-Morrison Co.  
Herbert, Alfred, Limited.  
Holman Bros., Ltd.  
Sullivan Machinery Co.

**Cars:**

Canadian Mead-Morrison Co.  
Herbert, Alfred, Limited.  
Holman Bros., Ltd.  
John J. Garthshore.  
Peacock Brothers, Limited.  
The William Kennedy & Sons, Ltd.

**Car Fullers:**

Canadian Mead-Morrison Co.

**Car Wheels and Axles:**

Herbert, Alfred, Limited.  
Holman Bros., Ltd.  
Hull Iron & Steel Foundries, Ltd.  
John J. Garthshore.  
Peacock Brothers, Limited  
The William Kennedy & Sons, Ltd.

**Carriers (Gravity):**

Jones & Glassco, Reg.

**Cast Steel Gears:**

Canada Foundries, Ltd.  
The William Kennedy & Sons, Ltd.

**Castings (Iron and Steel):**

Herbert, Alfred, Limited.  
Holman Bros., Ltd.  
Hull Iron & Steel Foundries, Ltd.  
Peacock Brothers, Limited.  
The William Kennedy & Sons, Ltd.

**Cement Machinery:**

Hadfields, Limited.  
Hull Iron & Steel Foundries, Ltd.  
The William Kennedy & Sons, Ltd.

**Chains:**

Jones & Glassco, Reg.  
Canadian Link-Belt Co., Ltd.  
Greening, B., Wire Co., Ltd.

**Chain Drives:**

Jones & Glassco (Regd.).

**Chain Drives—Silent and Steel Roller:**

Canadian Link-Belt Co., Ltd.  
Hans Renold of Can., Ltd.  
Jones & Glassco (Regd.).

**Chemist:**

Thos. Heyes & Sons.  
Milton Hersey Co.  
Ledoux & Co.

**Chrome Ore:**

Everitt & Co.

**Crusher Jaws:**

Canadian Steel Foundries, Ltd.  
The William Kennedy & Sons, Ltd.

**Crushing Rolls:**

Canadian Steel Foundries, Ltd.  
The William Kennedy & Sons, Ltd.

**Classifiers:**

The Door Company

**Clutches:**

Canadian Link-Belt Co., Ltd.  
Hans Renold of Can., Ltd.

**Coal:**

Dominion Coal Co.  
Nova Scotia Steel & Coal Co.

**Coal Cutters:**

Sullivan Machinery Co.  
Canadian Ingersoll-Rand Co., Ltd.  
Herbert, Alfred, Limited  
Holman Bros., Ltd.  
Peacock Brothers, Limited

**Coal Crushers:**

Canadian Link-Belt Co., Ltd.  
Peacock Brothers, Limited.

**Coal Mining Machinery:**

Canadian Ingersoll-Rand Co., Ltd.  
Canadian Rock Drill Co.  
Denver Rock Drill Mfg. Co., Ltd.  
Sullivan Machinery Co.  
Hadfields, Limited.  
Hendrick Mfg. Co.  
Herbert, Alfred, Limited  
Holman Bros., Ltd.



- Pipes:**  
Consolidated Mining & Smelting Co.
- Coal and Coke Handling Machinery:**  
Canadian Link-Belt Co. Ltd.
- Coal Pick Machines:**  
Canadian Ingersoll-Rand Co., Ltd.  
Herbert, Alfred, Limited.  
Holman Bros., Ltd.  
Sullivan Machinery Co.
- Forges:**  
Canadian Steel Foundries, Ltd.  
Hull Iron & Steel Foundries, Ltd.  
J. J. Gertschke
- Furnaces—Assay:**  
Lymans, Limited.  
Mine & Smelter Supply Co.
- Gasoline Engines:**  
Belliss & Morcom, Ltd.  
Laurie & Lamb.
- Gasoline Extraction Compressors:**  
Canadian Ingersoll-Rand Co., Ltd.  
Sullivan Machinery Co.
- Gasoline Tanks:**  
Can. Chicago Bridge & Iron Co., Ltd.  
Horton Steel Works, Ltd.
- Gaskets:**  
Gutta Percha & Rubber, Ltd.
- Gears:**  
Hans Renold of Canada, Ltd.  
Jones & Glassco, Regd.  
The William Kennedy & Sons, Ltd.
- Gears (Cast):**  
Canadian Link-Belt Co., Ltd.  
Hull Iron & Steel Foundries, Ltd.  
The William Kennedy & Sons, Ltd.
- Gears, Machine Cut:**  
The Hamilton Gear & Machine Co.  
The William Kennedy & Sons, Ltd.
- Gold Refiners:**  
Goldsmith Bros.
- Gold Trays:**  
Can. Chi. Bridge & Iron Works, Ltd.  
Horton Steel Works, Ltd.
- Grab Buckets:**  
Canadian Mead-Morrison Co.
- Hand Cars:**  
Sylvester Mfg. Co., Ltd.
- Hose:**  
Goodyear Tire & Rubber Co.  
Gutta Percha & Rubber, Ltd.  
Dunlop Tire & Rubber Co.
- Hammer Rock Drills:**  
Canadian Ingersoll-Rand Co., Ltd.  
Canadian Rock Drill Co.  
Denver Rock Drill Mfg. Co., Ltd.  
Herbert, Alfred, Ltd.  
Sullivan Machinery Co.
- Hangers and Cables:**  
Stan. Underground Cable Co., Ltd.
- Heating Systems:**  
Canadian Sirocco Co., Ltd.
- High Speed Steel:**  
Hadfields, Ltd.
- Hoists—Air, Electric and Steam:**  
Canadian Ingersoll-Rand Co., Ltd.  
Canadian Rock Drill Co.  
Denver Rock Drill Mfg. Co., Ltd.  
Herbert, Alfred, Ltd.  
Holman Bros., Ltd.  
Jones & Glassco, Regd.  
Mine & Smelter Supply Co.  
Canadian Link-Belt Co., Ltd.  
Peacock Bros., Ltd.  
Sullivan Machinery Co.
- Hoisting Towers:**  
Canadian Mead-Morrison Co.
- Hose:**  
Gutta Percha & Rubber, Ltd.
- Hydraulic Machinery:**  
Hadfields, Ltd.  
Belliss & Morcom, Ltd.  
Laurie & Lamb.  
The William Kennedy & Sons, Ltd.
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Horton Steel Works, Ltd.  
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Northern Canada Supply Co.
- Jaw & Gyratory Crushers:**  
Engineering & Equipment.  
Herbert, Alfred, Limited.  
Holman Bros., Ltd.
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Northern Electric Co.  
Peacock Bros., Ltd.
- Lead (Pig):**  
Consolidated Mining & Smelting Co.
- Levels:**  
C. L. Berger & Sons.
- Light & Heavy Steel Plate Construction:**  
Hendrick Mfg. Co.  
The William Kennedy & Sons, Ltd.
- Locomotives (Steam, Compressed Air and Storage):**  
Canadian Ingersoll-Rand Co., Ltd.  
Laurie & Lamb.
- Link Belt:**  
Canadian Link-Belt Co., Ltd.  
Northern Canada Supply Co.  
Jones & Glassco, Regd.
- Machine Guards:**  
Greening, B. Wire Co., Ltd.
- Magnesium Metal:**  
Everitt & Co.  
Hull Iron & Steel Foundries, Ltd.
- Manganese Steel:**  
Hadfields, Ltd.  
Hull Iron & Steel Foundries, Ltd.
- Manganese-Steel Trackworks:**  
Canadian Steel Foundries, Ltd.
- Metal Merchants:**  
Consolidated Mining & Smelting Co.  
C. L. Constant Co.  
Everitt & Co.
- Metallurgical Engineers:**  
The Dorr Co.
- Metallurgical Machinery:**  
Dwight & Lloyd Sintering Co.  
The Dorr Co.  
The Mine & Smelter Supply Co.
- Metal Work, Heavy Plates:**  
Can. Chicago Bridge & Iron Co., Ltd.  
Horton Steel Works, Ltd.  
The William Kennedy & Sons, Ltd.
- Mica:**  
Everitt & Co.
- Mine Cars:**  
Canadian Steel Foundries, Ltd.  
The William Kennedy & Sons, Ltd.
- Mining Engineers:**  
Hersey, M. & Co., Ltd.
- Mining Drill Steel:**  
Hadfields, Limited.
- Mining Requisites:**  
Dominion Wire Rope Co., Ltd.  
Hadfields, Limited.  
Hull Iron & Steel Foundries, Ltd.
- Mining Ropes:**  
Dominion Wire Rope Co., Ltd.  
Peacock Brothers, Ltd.
- Mine Surveying Instruments:**  
C. L. Berger & Sons.
- Molybdenite:**  
Everitt & Co.
- Motors:**  
Peacock Brothers, Ltd.
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The Mond Nickel Co., Ltd.
- Ore Handling Equipment:**  
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Canadian Mead-Morrison Co.  
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Ledoux & Co.  
Can. Laboratories.  
Hoyt Metal Co.
- Ores & Metals—Buyers & Sellers of:**  
Geo. G. Blackwell.  
Consolidated Mining & Smelting Co.  
Everitt & Co.
- Oils:**  
Hercules Powder Co.
- Pavers:**  
Wettlaufers Brothers.  
Gutta Percha & Rubber, Ltd.  
Laurie & Lamb.
- Perforated Metals:**  
Hendrick Mfg. Co.  
Canada Wire & Iron Goods Co.  
Greening, B. Wire Co.
- Pillow Blocks:**  
Canadian Link-Belt Co., Ltd.  
The William Kennedy & Sons, Ltd.
- Pipe — Wood Stave:**  
Pacific Coast Pipe Co.  
Mine & Smelter Supply Co.  
Canadian Ingersoll-Rand Co., Ltd.
- Piston Rock Drills:**  
Mine & Smelter Supply Co.  
Herbert, Alfred, Limited.  
Holman Bros., Ltd.
- Plate Works:**  
Can. Chi. Bridge & Iron Co., Ltd.  
Hendrick Mfg. Co.  
The William Kennedy & Sons, Ltd.  
Horton Steel Works, Ltd.
- Platinum Refiners:**  
Goldsmith Brothers.
- Pneumatic Tools:**  
Canadian Ingersoll-Rand Co., Ltd.  
Herbert, Alfred, Limited.  
Holman Bros., Ltd.
- Portable Column Hoists:**  
Canadian Ingersoll-Rand Co., Ltd.  
Denver Rock Drill Mfg. Co.  
Herbert, Alfred, Limited.  
Holman Bros., Ltd.  
Sullivan Machinery Co.
- Power Factor Correcting Devices:**  
Griswold & Co.
- Power Condensers:**  
Griswold & Co.
- Prospecting Mills & Machinery:**  
Mine & Smelter Supply Co.
- Pumps—Pneumatic:**  
Canadian Ingersoll-Rand Co., Ltd.  
Smart-Turner Machine Co.  
Sullivan Machinery Co.
- Pumps—Steam:**  
Canadian Ingersoll-Rand Co., Ltd.  
Northern Canada Supply Co.  
Peacock Brothers, Ltd.  
Smart-Turner Machine Co.
- Pumps—Turbines:**  
Smart-Turner Machine Co.  
Canadian Ingersoll-Rand Co., Ltd.  
Laurie & Lamb.  
Peacock Brothers, Ltd.
- Pumps—Vacuum:**  
Canadian Ingersoll-Rand Co., Ltd.  
Smart-Turner Machine Co.  
Peacock Brothers, Ltd.
- Pumps—Valves:**  
Peacock Brothers, Ltd.
- Pulleys Shafting and Hangers:**  
The William Kennedy & Sons, Ltd.
- Pulverizers—Laboratory:**  
Herbert, Alfred, Limited.  
Holman Bros., Ltd.  
Mine & Smelter Supply Co.
- Pumps—Boiler Feed:**  
Canadian Ingersoll-Rand Co., Ltd.  
Smart-Turner Machine Co.  
Peacock Brothers, Ltd.
- Pumps—Centrifugal:**  
Canadian Ingersoll-Rand Co., Ltd.  
Laurie & Lamb.  
Peacock Brothers, Limited.  
Smart-Turner Machine Co.
- Pumps—Diaphragm:**  
The Dorr Company.  
The William Kennedy & Sons, Ltd.
- Pumps—Electric:**  
Canadian Ingersoll-Rand Co., Ltd.  
Laurie & Lamb.  
Peacock Brothers, Ltd.  
Smart-Turner Machine Co.  
Sylvester Mfg. Co., Ltd.
- Push Cars:**  
Sylvester Mfg. Co.
- Poultry Netting:**  
Greening, B. Wire Co., Ltd.
- Quarrying Machinery:**  
Canadian Ingersoll-Rand Co., Ltd.  
Canadian Rock Drill Co.  
Denver Rock Drill Mfg. Co., Ltd.  
Hadfields, Limited.  
Herbert, Alfred, Limited.  
Holman Bros., Ltd.  
Sullivan Machinery Co.

- Rails:**  
Hadfields, Limited.  
John J. Gartshore.
- Refiners:**  
Goldsmith Brothers.
- Riddles:**  
Hendrick Mfg. Co.
- Rod Mills:**  
Mine & Smelter Supply Co.
- Roll Shells:**  
The William Kennedy & Sons, Ltd.  
Canadian Steel Foundries, Ltd.
- Roller Chain:**  
Hans Renold of Canada, Ltd.  
Canadian Link-Belt Co., Ltd.  
Jones & Glassco, Regd.
- Rope—Manilla & Jute:**  
Jones & Glassco, Regd.  
Allan, Whyte & Co.
- Rope—Wire:**  
Anglo Canadian Wire Rope Co.  
Allan, Whyte & Co., Ltd.  
Canada Wire & Cable Co.  
Canada Wire & Iron Goods Co.  
Dominion Wire Rope Co., Ltd.  
Greening, B. Wire Co.
- Rolls—Crushing:**  
Canadian Ingersoll-Rand Co., Ltd.  
Everitt & Co.  
Hadfields, Limited.  
Hull Iron & Steel Foundries, Ltd.  
Herbert, Alfred, Ltd.  
Holman Bros., Ltd.  
Wettlaufer Bros.
- Samplers:**  
Canada Metal Co.  
Ledoux & Co.  
Milton Hersey Co.  
Thos. Heyes & Son.  
Mine & Smelter Supply Co.
- Screens:**  
Canadian Ingersoll-Rand Co., Ltd.  
Greening, B. Wire Co.  
Hendrick Mfg. Co.  
Canada Wire & Iron Goods Co.
- Screens—Cross Patent Flanged Lip:**  
Hendrick Mfg. Co.
- Screens—Perforated Metal:**  
Hendrick Mfg. Co.
- Screens—Shaking:**  
Canadian Link-Belt Co., Ltd.  
Hendrick Mfg. Co.
- Screens—Revolving:**  
Canadian Link-Belt Co., Ltd.  
Hendrick Mfg. Co.  
The William Kennedy & Sons, Ltd.
- Separators:**  
Smart-Turner Machine Co.  
Mine & Smelter Supply Co.
- Sewer Pipes:**  
Wettlaufer Bros.
- Shaft Contractors:**  
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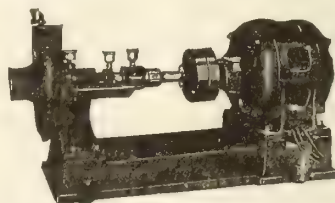
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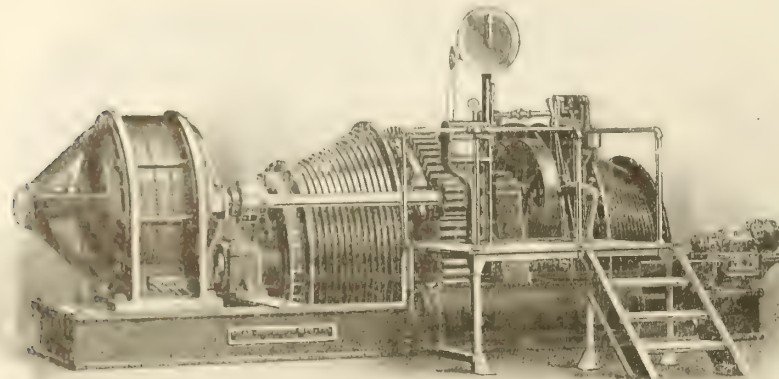
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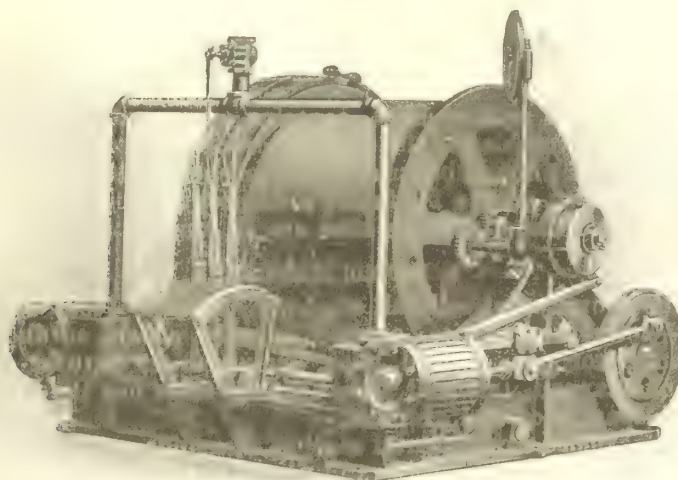
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# Ontario's



# Minerals

PROVINCE OF ONTARIO

DEPARTMENT OF MINES

HON H. MILLS, Minister of Mines

## Mineral Areas.

Ontario, with its 407,262 square miles, contains many millions of acres in which the geological formations are favorable for the occurrence of minerals, 70 per cent of the area being underlain by rocks of pre-Cambrian age. The phenomenally rich silver mines of Cobalt occur in these rocks; so also do the far-famed nickel-copper deposits of Sudbury, the gold of Porcupine and Kirkland Lake, and the iron ore of Magpie and Moose Mountain mines.

## Economic Minerals.

In addition to the above, practically all economic minerals (coal and tin excepted) are found in Ontario:—actinolite, apatite, arsenic, asbestos, cobalt, corundum, feldspar, fluor-spar, graphite, gypsum, iron pyrites, lead, mica, molybdenite, natural gas, palladium, petroleum, platinum, quartz, salt, talc and zinc. This Province has the largest deposits on the continent of talc, feldspar, mica and graphite.

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## Mineral Production.

Preliminary returns show the output of the mines and metallurgical works of the Province for the year 1921 to be worth \$48,128,387, of which the metallic production was \$27,574,202.

The following figures show the rapid growth of Ontario's mineral industry by five-year periods since 1891:

| Year.          | Value.      | Year.          | Value.       |
|----------------|-------------|----------------|--------------|
| 1891 . . . . . | \$4,705,672 | 1906 . . . . . | \$22,388,383 |
| 1896 . . . . . | 5,235,003   | 1911 . . . . . | 41,976,797   |
| 1901 . . . . . | 11,831,086  | 1916 . . . . . | 65,303,822   |

## Dividends.

Dividends and bonuses paid to the end of 1921 amounted to \$23,140,734 for gold mining companies, and \$84,388,185 for silver mining companies or a total of \$107,528,919.

## Mining Regulations.

A miner's license costs \$5.00 per annum, and entitles the holder to stake out in any or every mining division three claims of 40 acres each. After performing 200 days' assessment work on a claim, patent may be obtained from the Crown on payment of \$2.50 or \$3.00 per acre, depending on location in unsurveyed or surveyed territory.

## Assay Office.

The Provincial Assay Office at No. 5 Queen's Park, Toronto, is maintained by the Department of Mines for the free identification of minerals, free assays under the provisions of the Mining Act of Ontario, and also for general assay work as per the Schedule of Charges which may be obtained on application.

## Temiskaming Testing Laboratories

The Department maintains, at Cobalt, an ore sampling and testing laboratory which is now prepared to receive parcels of gold ore from 100 pounds upward, and after sampling and assaying the same to pay to the shipper the value thereof, less treatment charges. The purpose is to afford a market for ores extracted by prospectors and others in developing their mining claims, enabling them to obtain funds which they can use for further work and to report on the most satisfactory method of treatment. Fuller information may be obtained on application to the Manager, Temiskaming Testing Laboratories, Cobalt, Ontario.

## Publications.

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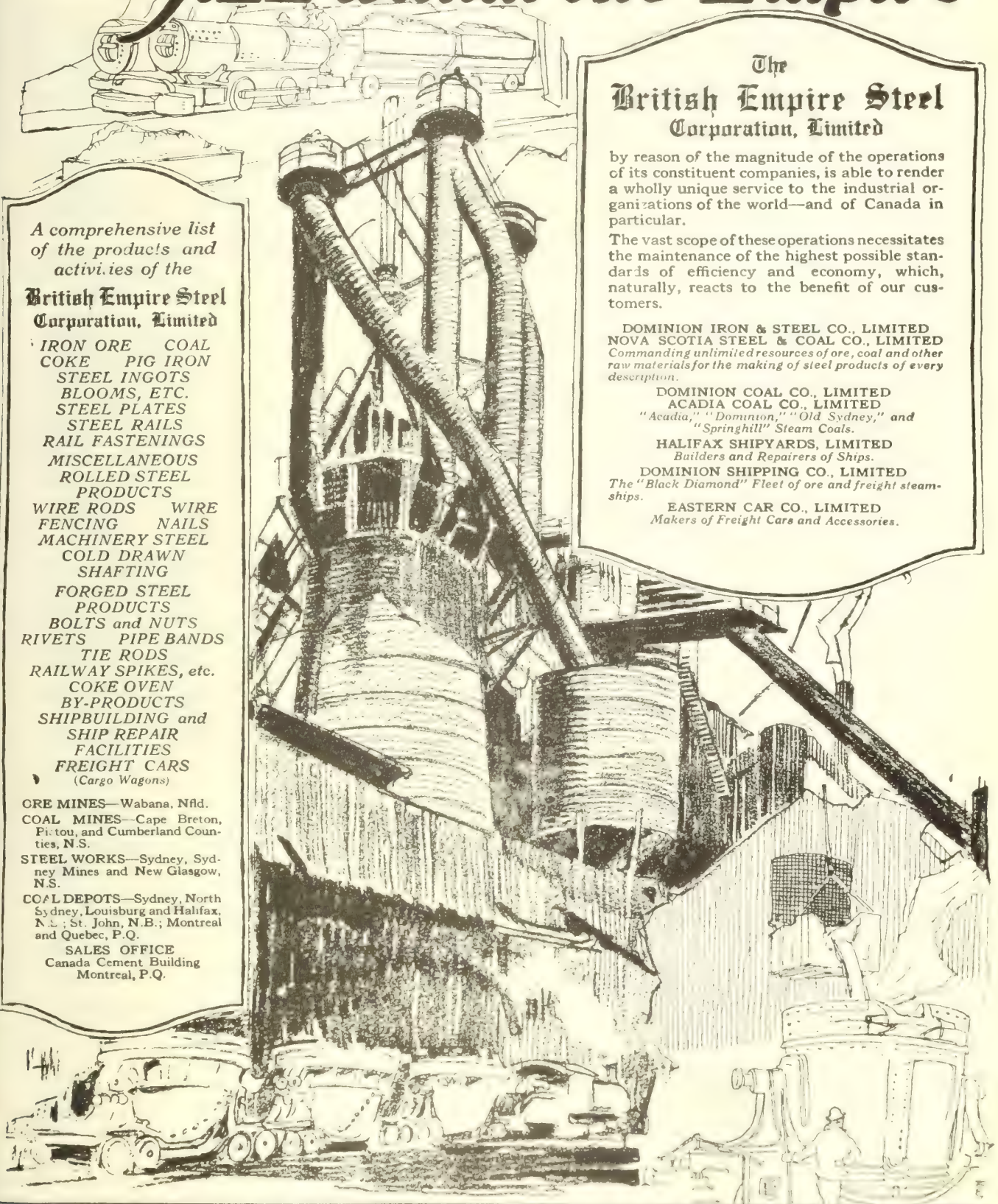
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The holder of the certificate may stake mining claims to the extent of 200 acres.

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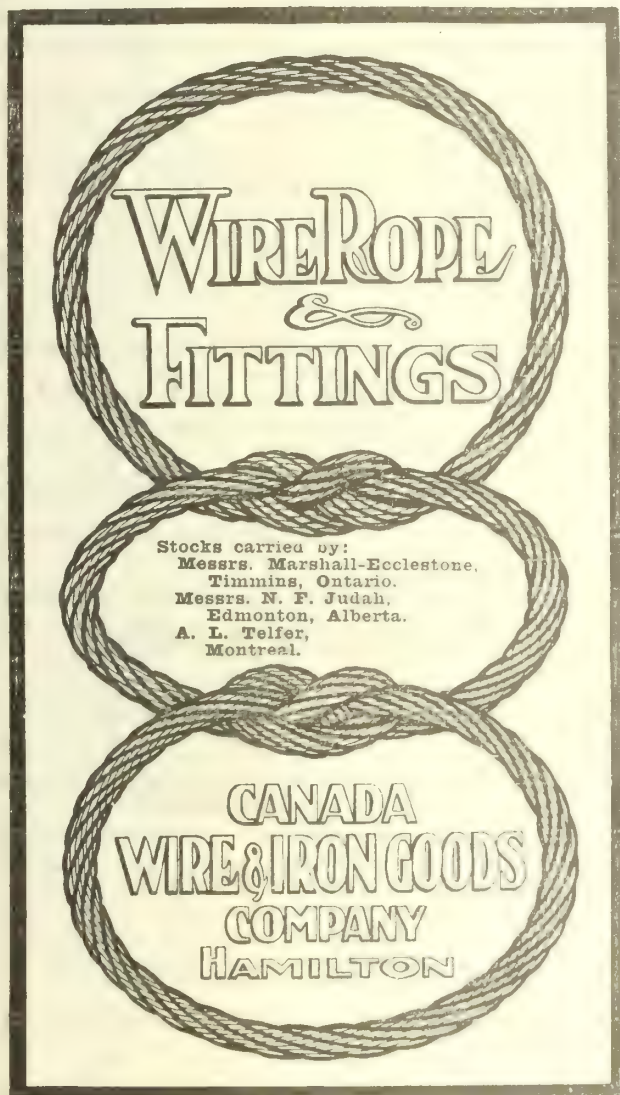
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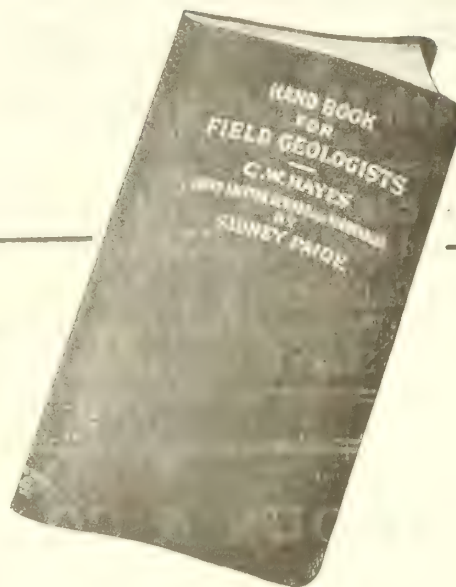
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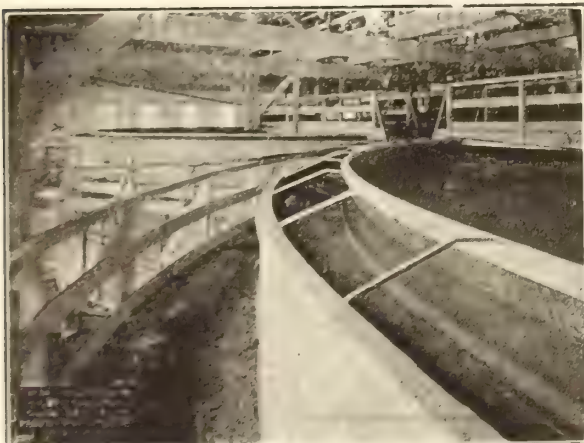
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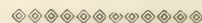


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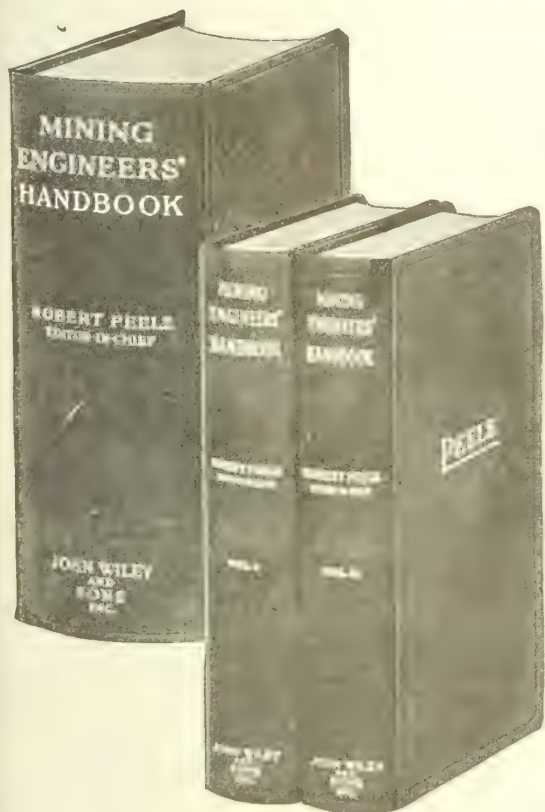
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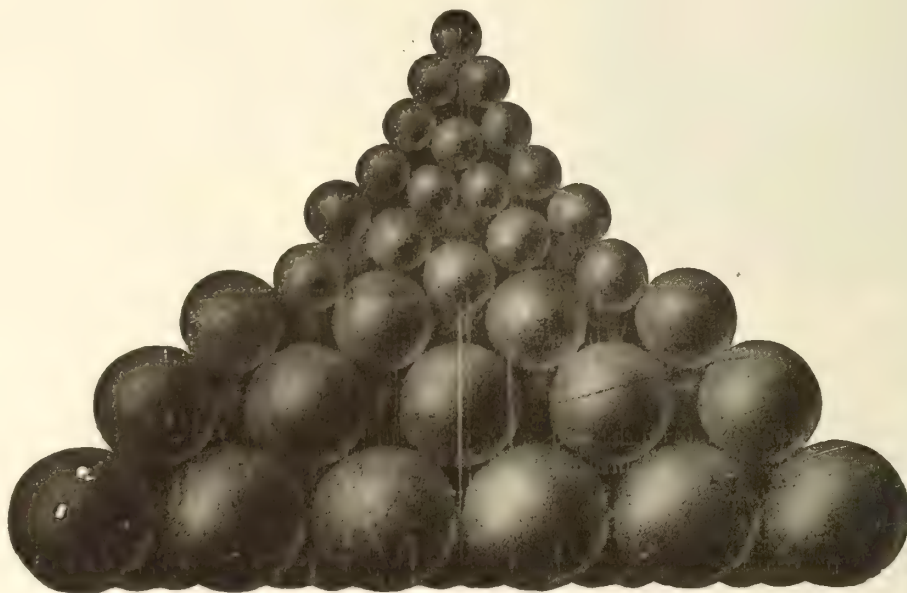
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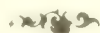
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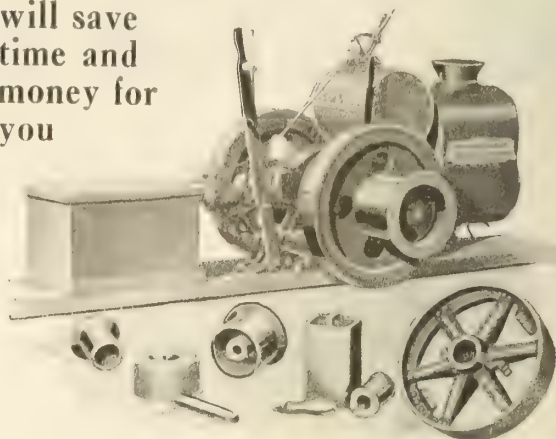
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## -:- EDITORIAL -:-

*If judicious men skilled in chymical affairs shall once agree to write clearly and plainly of them, and thereby keep men from being stunned, as it were, or impressed upon by dark and empty words; 'tis to be hoped that these men [writers of vain books] finding that they can no longer write impertinently and absurdly . . . . . will be reduced either to write nothing, or books that may teach us something, . . . . . and so . . . . . we shall either by their books receive an advantage, or by their silence escape an inconvenience. —Robert Boyle, in "The Skeptical Chymist" — 1680.*

### A NEED, AND AN OPPORTUNITY

In the chain of events that leads on to the operation of a mine in Canada, there is a missing link. A fortune awaits the man who will forge that link.

Our mining industry is now well equipped with engineers, capable of the wise and economical direction of mining operations and conversant not only with the economic principles they must observe in order to make the most of their enterprises, but likewise with the special difficulties that beset the path of the miner. The operation of our mines can safely be left in their hands.

There is now a considerable number of mining engineers and economic geologists specially experienced in the initial development of prospects. It requires vision beyond the ordinary and a specially trained judgment to perform successfully and economically this important function in the making of a mine. Money must not be wasted, yet no reasonable chance of disclosing the pay-shoots must be left unexplored. It is said of the engineer whose acumen resulted in the discovery of the bonanza ore of the Premier that he is a "wizard"; the development of most prospects requires a certain amount of this wizardry.

In numerous mining districts across the Dominion, our prospectors are disclosing promising "showings" quite as rapidly as they can be taken up and developed. So much of our mineral-bearing territory is still completely unexplored, and such a large part of what has been run over in a preliminary way requires intensive prospecting, that prospects are sure to be discovered in large numbers for many years to come. Our growing mining industry is providing both the incentive and the means for a constantly increasing number of competent prospectors.

A number of our principal mineral-bearing areas are well served with railways. In fact the over-expansion of our railways has been to a large extent into mineral areas that have failed so far to provide the traffic anticipated. Almost without exception these

areas promise a good return to the prospector who will do faithful and discriminating work and to the engineer who will develop the "finds."

It is in the realm of finance that there is a need, and an opportunity. We have today, and shall always need, the little bands of adventurers who will expend their time or their spare cash on prospecting or on grubstaking a prospector. We have likewise a rapidly growing number of the syndicates formed with the object of developing prospects into near-mines. We shall need many more of these syndicates as the years progress, and there is every indication that their number will meet the need. There are also the organizations through which established mining corporations seek to re-invest part of their profits in the industry.

What our mining industry needs most just now is capital, in large amounts. We are getting a certain amount from investors in the United States, and a lesser amount from Britain. We can, and should, get very large amounts from the Canadian public. The inherent attractiveness of mining investment is such that it compels the attention of thousands of people who would not dream of speculative investment in any other field. At present the money of these people is withheld from the mining field. Why? Because there is at present available no agency for mining investment that will assure them both of scrupulous dealing and of discriminating expenditure. The investing public do not require a guaranteed return from a mining investment; all they want is a square deal and a good run for their money.

The man who fills this bill will not only do the mining industry and the country a service of first-rate importance, but he will earn a fortune. The public will entrust him with vast sums of money, and he will expend it wisely and profitably, with the aid of skilled engineers. He will do for the mining industry what others have done for, say, our water-powers; he will select promising near-mines and will provide them with the mining and milling equipment and the working capital necessary for profitable production. His



ventures will not always succeed; but on the average he will recoup his clients many-fold for their investment.

The Canadian mining industry, like Diogenes, is looking for an honest man.

#### CONFERENCE ON INDUSTRIAL RESEARCH

There is now in Canada a substantial and widespread interest in research. Up to the present, however, this interest has remained, in the main, unorganized and therefore ineffective. It was in an effort to consolidate this general interest by providing a definite objective and a means for its practical application that the Advisory Research Council at Ottawa proposed the establishing of a National Research Institute three years ago. Their attempt failed. No alternative solution has been provided, nor has any effective alternative been even suggested.

Meantime we are losing, every year and every month, the advantage conferred by a national institution to which each and every Canadian with an industrial problem to solve can come for advice, aid, and co-operation. It is true that the existing organization for research, notably those in our universities, are able and willing to aid industrial research in every way possible; but their limitations, which are obvious and have been the subject of much public discussion, prevent them from fulfilling the functions of a national institution. The fact that the universities, some of which were at first strongly opposed to the founding of a central institute for industrial research, are now uniformly in favour of it demonstrates their own realization of the need.

There is now renewed hope that the issue may be brought to a practical conclusion. Canadian manufacturers and boards of trade have, during the past three years, shown a surprising unanimity in favour of industrial research organized on comprehensive national lines. They lent their support, individually, to the Advisory Research Council's last attempt to found a National Research Institute, but it was not enough to ensure success. Now it seems that they are ready collectively to support the cause, and we can hope for a more fortunate result.

The Canadian Manufacturers' Association has arranged for a conference in Ottawa on February 20, 21 and 22 next, to which have been invited representatives of our universities. The Advisory Research Council will be represented; but (be it noted) the meeting has been arranged by the representatives of industry.

The leaders in Canadian industry have, during recent years, given indubitable evidence of their interest in industrial research. In many cases, unfortunately, this interest has not been crystallized in action, mainly

for lack of a compelling opportunity. We are confident that now they have tackled the problem officially, through their Association, they will find a solution—a safe, sound and sane solution—and will put it promptly into effect.

#### NEW WORK AT THE OLD MIKADO

An attempt is now in progress to operate once more the Mikado Mine, on the Lake of the Woods. Because this is a serious and honest attempt, and because a successful conclusion would mean so much to the discredited and abandoned gold districts of Northwestern Ontario, we have asked Colonel Machin to describe in the pages of the *Journal* the work he has in hand and his plans for the future.

The history of the gold fields of Lake of the Woods, the Seine river, Shebandowan, the Manitou and Wabigoon lakes, records a long series of excited adventures, wild speculations and stock-jobbing, with a rare example of an honest and enthusiastic, but misdirected, attempt at mine development. Many a likely prospect was ruined, not irretrievably but for many years to come. Numerous nice little mines were so saddled with debt and so involved in litigation that genuine mining operations were prevented. A few producing mines continued a precarious existence in spite of difficulties, but one by one they succumbed until the whole region was deserted.

The difficulties under which these properties struggled were, be it noted, mostly man-made. Nature had been fairly generous, if one can judge by the partial evidence disclosed. Dishonesty, greed, stupid management and ignorance were to a large extent responsible for the failures.

Though it is a well recognized fact that a discredited mining field is exceedingly difficult to re-open, however well authenticated its intrinsic merits, there are very, very few, who will act upon this knowledge. This is a curious phase of human nature, but still it is an undoubted fact. However, time has done much to clear the air in northwestern Ontario, and now it is possible to examine the facts in a fairly clear atmosphere. These facts are in many cases interesting and in a few cases promise well for the establishment of profitable gold mining.

It is difficult to interest mining men and mining investors in an abandoned field. Colonel Machin has been forced, therefore, to seek the co-operation of men whose eyes have not been thrown out of focus by gazing too intently at the misdirected efforts of former years. There is an element of danger in thus combining the efforts of men unaccustomed to the mining field; but it has the virtue of boldness, and there is no alternative.

We hope for much from the present venture at the Mikado mine. Though only partially explored, the

veins are very promising. Sufficient money has been raised to test out the property thoroughly. Colonel Machin's connection with the venture ensures the investors against stock jobbery or wilful waste of money. If competent direction is provided for the actual work of exploration and mining, the new Mikado may prove to be the pioneer in a northwestern Ontario highly production of gold bullion.

### BRITISH MONEY FOR CANADIAN MINES

A London financial journal, from which we print an extract on another page, gives some of the practical reasons why the British public have taken so little interest in Canadian gold mines. British investors are, in the main, shrewd and far-sighted, and since Canadian gold mines have now an inherent and well warranted attractiveness, there must assuredly be a good and sufficient reason why the British public is not investing in them to any substantial extent. The reasons may be summarised as follows:

It is difficult to buy and sell Canadian mining shares in London. They are not listed on any London exchange, and there are no local agents to receive and execute orders. There are no accredited London agents from whom information can be obtained from time to time. Our Canadian mining companies are not in the habit of publishing, month by month or quarter by quarter, detailed statements of the results of operations, as do the South African mines.

The British investing public are accustomed to these facilities, and until they or some satisfactory substitute have been provided it is not likely that Canadian mines will get their share of British capital. Provided these and similar conditions are met (and they can be met very simply) there is available in Britain a vast store of capital for the development of Canadian mines.

### EDITORIAL NOTES

The outspoken pronouncement of United Mine Workers headquarters at Indianapolis in reply to the request of a Nova Scotian "local" for a ruling on affiliation with the "red" organization in Moscow is good to hear. The handful of wild radicals in the colliery districts of Nova Scotia will find no substantial support either in Canada or in the United States.

The huge "porphyry" deposits of copper ore of the United States and Chile are at present the main sources of supply of the world's copper. They are worked profitably with a copper content as low as 1.5 per cent. On the outcrop it is very easy to overlook low-grade copper ore such as this, as it usually exhibits the green and blue copper stain only when the rock is broken into, and the iron gossan is ordinarily very sparse and

often almost unnoticeable. It is predicted by students of the metal market that the price of copper will reach a comparatively high level shortly and will remain there for years to come. It will be worth while for Canadian prospectors to keep a sharp eye for possible porphyry copper deposits.

A new gold prospect that appears to have considerable promise has been described, privately, to the *Journal* by the mining engineer who holds the right to dispose of it. The name and address of this engineer can be had on application by any who wish to look into the matter.

### HISTORY

#### II

O! They were some go-getters,  
These mining men of old;  
On earth are not their betters  
For action swift and bold.  
No socialists existed,  
Class-consciousness was not,  
And politics consisted  
In killing on the spot.  
These workers neozoic  
Had manners somewhat tough:  
They had to be heroic  
To call each other's bluff.  
No Workmen's Compensation  
Gave trouble to the boss,  
Or caused him perturbation,  
Or monetary loss.  
No worries did enmesh one,  
For if a miner died  
You simply got a fresh one,  
And let the matter slide.  
The dietary olden  
Included gruesome things,  
(Whose names shall be withholden)  
Like snakes equipped with wings.  
Large beasts they harshly whacked till  
They were entirely dead;  
They prized fresh pterodactyl  
And potted mammoth head.

\* \* \*

O! They were some go-getters,  
These mining men of old;  
On earth are not their betters  
For action swift and bold.

J. C. M.

[Editor's Note: — Some people have the mistaken notion that the poet's pay is "easy money". To any with this erroneous idea, we recommend an attempt to duplicate our own poet's rhyme for "pterodactyl."]



# Progress of Consolidated M. S. & P. Co.

SULLIVAN MINE AND CONCENTRATOR; INCREASED SMELTER CAPACITIES; NEW MACHINE SHOP AND FOUNDRY; PROSPECTS OF COPPER PRODUCTION

The construction of a concentrator at Kimberley, B.C., to treat the ores of the Sullivan Mine is the outstanding new work of the Consolidated Mining and Smelting Co., of Canada. This plant will have a capacity of between 1500 and 2500 tons a day. It will be of steel and concrete practically throughout. It will also be the last word in point of equipment in every detail. Some time during the early part of this year it will be ready for operation and its contribution to the economical handling of the ores of the Sullivan, one of the greatest lead-zinc properties on the continent, will form one of the most important of recent developments in connection with the mining industry of Western Canada.

The great objective is the saving of transportation costs. At present the ore as mined is shipped for treatment to the Trail Smelter. When its wheels begin revolving there will be shipped from the Sullivan the lead and zinc concentrates only. The result will be the release of the present thousand-ton mill at Trail for the handling of the production of the Rossland Mines owned by the Company.

Construction operations on the mill were started last spring, and the plant is about half completed now. In looking at the layout on the map, "Hill," "Tunnel," and "Concentrator" are at three points of a triangle. The "Hill" is the old portion of the mine, with its own connections and shipping facilities. The "Tunnel" is the portion of the mine worked through the big crosscut that was driven about three years ago, on the 3900-foot level. A raise from the Tunnel broke through into the Hill some 20 months ago, and the bulk of the ore will eventually come out through the lower level.

In preparation for the increased output, the movement of ore underground in the Tunnel has been re-organized by increasing the gauge of the electric railway to three feet and by installing 500-volt locomotives. These have to haul the ore from a point approximately two miles in. The mine has also been electrified throughout, and two new 3,000-cubic foot direct-connected air compressors have been installed, their location being at the Tunnel.

The ore from the Tunnel is dumped into a 900-ton receiving bin, from which it is fed into a 36 by 42 inch Buchanan jaw crusher, the product of which passes into two No. 8 Gates crushers. The product from this primary crushing is carried to a massive railway shipping bin holding 2500 tons, just completed.

To get the crushed ore from this point to the receiving bins at the concentrator, which is a couple of miles on the further side of Kimberley, a railway three miles long has been built. An incident of this railway is a trestle 1000 feet long and 53 feet maximum height, standing on piles, which was rushed up in 18 days. A line has also been built from Kimberley to the receiving bins. There is a third railway link, which connects the C. P. R. at a point below the site of the Taylor mill, with the concentrator's shipping bins. This

last line will be used both for shipping ore concentrates, and for bringing up coal for the boiler plant.

The great concentrator is over 700 feet long, down the slope, and 110 feet in width. Structural steel, with gunite — a concrete mixture blown from a gun — for the walls, and concrete footings, concrete floors, and concrete bases, are used, constituting of course the most permanent and indestructible type of construction. The roofs are as nearly fireproof as possible, with two-by-four lumber laid on edge, and a final covering of felt, tar and gravel. This same type of construction is used in all the new buildings.

When the plant finally commences operations, the crushed ore, arriving at the millsite, will first be weighed on 150-ton scales of the Fairbanks suspension type, and will then pass into a 1000-ton receiving bin, which has been blasted out of the rock. Conveyors will feed it into two 72 by 20-inch Garfield Alaska type rolls, arranged in series.

By means of other conveyors, the product from the rolls will be elevated and distributed into a 2500-ton receiving bin of massive proportions which is a sort of cupola above the concentrator. Pulley feeders will then feed it into 8 by 48 Hardinge mills. The Hardinge will be used for fine grinding throughout the concentrator, and eight of them will be installed.

The remainder of the plant will exemplify the differential flotation principle, with the use of alkaline solutions, as applied in the process worked out at the experimental zinc mill at Trail, which for the last year or more has been successfully treating 1000 tons per day of the refractory Sullivan ore. For refractory qualities the Sullivan ore, which is composed of various iron, zinc and lead sulphides, very intimately mixed, with practically no rock gangue, is supposed to hold the world's championship; but the Consolidated's specialists have successfully charmed it, and high-grade concentrates of both lead and zinc are now made without trouble, with good recoveries of both metals.

In the big concentrator the flotation machines will be of a modified standard Minerals Separation type; that is to say, the basic principle of the Minerals Separation company's patent will be used. The process, however, is far advanced from that contemplated in the original design.

There is a point of special interest in connection with the thickening of the slimes from the flotation machines. While some of the products will be thickened in Dorr thickeners, others will be thickened in Genter thickeners. The Genter thickener has been largely developed at the Sullivan mill at Trail. It is very compact while having a very large capacity, and its initial cost is much less than that of the Dorr, which is not much more than a settling tank. Several of the Genter thickeners can be put in the space of one Dorr of the same capacity. It is really a combination of thickener and filter, the solution drawn off from the Genter thickeners having already gone through a filtering process.



All the pulp from the thickeners will be filtered by the American disk filter.

Storage will be provided for the stocking of several thousand tons of both zinc and lead cake from the filter.

The mill will be driven by electric power, using a 575-volt three-phase 60-cycle current.

A machine shop, 45 by 150 feet in ground plan, is a part of the new equipment.

With the exception of the motors and coarse crushing machinery required practically all the machinery that will be used in the Sullivan concentrator is being made in the Trail shops of the Consolidated.

A very important development of the year has been the new line-up with respect to power. A year ago it was the expectation that the developments at Kimberley would require an extension of the power development at Bonnington Falls, by the West Kootenay Power and Light company, a subsidiary of the Consolidated. This has not been necessary, and the power will be supplied by the East Kootenay Power Company, from its Bull river and Elk river developments. Between 5,000 and 6,000 horse-power will be used by the mine and mill between them.

#### *Increased Capacity of Lead and Zinc Plants*

The new mill, however, is not the only item of progressive activity in which the Consolidated has been engaged. At the Trail Smelter there has been a 66 per cent. increase in the capacity of the Lead Refinery, which now can handle 150 tons in place of its former capacity of 90 tons a day. The former figure was attained in October last. This move is partly anticipatory of increases in lead-zinc ores from the Sullivan following the completion of the Kimberley Mill and partly to provide for prospective heavier demands from the Slocan District. As lead and silver are intimately associated in the characteristic ores of this territory, corresponding enlargements have been made in the silver refinery.

The tonnage of the zinc plant — a plant built to make 70 tons of zinc a day — has been brought up to a daily maximum of 100 tons, by improvements in processes and by increased efficiency.

An addition of the year has been the custom zinc plant of 30 tons capacity, comprising a complete separate roasting and leaching plant, which started operation June 1. By means of this plant Trail has been able to give the Slocan shippers a rate that nets them \$18 a ton more on the normal Slocan ore than is quoted by Trail's nearest competitor.

#### *Large Machine Shop at Trail*

These extensive enlargements and improvements in the institution's treatment plants do not represent the sum of the improvements. Plants that represent convenience and economy, but do not in themselves have any part in the processes of ore treatment, refinement of crude metal, or manufacture of the refined product, have had important accretions. For example, the big machine shop has been greatly enlarged, being now one of the largest shops in the province. It contains, among other machinery, the largest lathe in Canada, a Bertram lathe, Canadian made. Between its centers a cylinder 10 feet in diameter and 17 feet long can be hung for machining, or, at the other extreme, a cylinder 20 feet in diameter and four feet long. A crane

will pick up a complete 8 by 48 Hardinge mill, and the lathe will handle it. The general idea of having this great shop is to have as much as possible of the machinery required by the company for its plants and for its mines, of home manufacture, and already great economies have been effected. All the machinery for the great Sullivan concentrator at Kimberley, with the exception of the electric motors and the primary crushers, is being built at Trail. A recent glimpse of the shop revealed 160 parts for as many cells of the Minerals Separation flotation plant lined up. It is said that an automobile or a locomotive could be turned out.

#### *Large New Foundry*

Another betterment is "the most modern foundry in the province," the construction of which was started in November, and which went into commission a few weeks ago. This building, of steel and concrete, is 70 by 96 feet in ground dimensions. Over one-half of it a five-ton electric travelling crane moves back and forth. The other half has a second storey providing space for a pattern shop and a pattern storage room. The foundry has two cupolas for melting the metal, and a core-drying oven. It will also include a brass foundry. As an instance of the type of construction used, the upper floor consists of two-by-six lumber laid on edge, with concrete where the cupolas pass through it.

#### *Rossland Mines to Resume Next Fall*

The company is not at present operating its Rossland mines, but is keeping them pumped out, and in shape for resumption of operations. It is concentrating its efforts at present on getting in shape to mill the Sullivan ore at Kimberley, and the Rossland ore at Trail. When the Kimberley concentrator, now under construction, starts up next fall or perhaps at mid-summer, its operation will release for other uses the mill, now crushing 1000 tons of Sullivan ore a day, which has been used for the Sullivan experimentation. Until it shall have been shown that a larger mill than this will be justified in the interests of economy, the Rossland output will be handled by this mill. The much talked of Rossland concentrator will not be proceeded with at present.

#### *Copper Mines and Plants Idle*

During the depression of 1920-21, when so many smelters throughout the continent closed down, Trail still operated, and in 1921 actually increased the scale of its operations; but the company drew in its horns somewhat on mining, dropping development operation in numerous scattered mines about the province, and concentrating on production from its main properties.

At the present time none of its copper properties are being operated. The copper smelter and copper refinery are shut down. It is improbable that they will resume operation before the Rossland mines re-open, which will be when the Trail mill becomes available after it ceases to be required for the Sullivan ore. There is the possibility, of course, that the Canada Copper corporation may start up the Copper Mountain property earlier than that, in which case, of course, the copper plants would wait no longer.

The copper rod mill, specially built last year to take care of a substantial part of the output from the



greatly enlarged copper refinery, necessarily stands idle. It has never yet been operated.

#### Metal Prices

Markets during the year have been generally satisfactory, the net price movement having been upward. The price of zinc has risen about 40 per cent. and the price of lead is up about 20 per cent. Copper is also rising, leading to the hope that the mining of this ore may soon be attractive once more. On the other hand, silver is down materially.

A reflex of the increase in the price of metals is that the company's employees who are on a wage basis get a metal bonus of 60 cents a day. With the first war bonus of 50 cents still in effect they are now getting \$1.10 a day over pre-war wages. The staff also participate with an equivalent bonus.

The company at present has 1200 men working at Tadanac, 50 or 60 at Rossland, and 700 at Kimberley at the mine and on the construction of the mill.

All power for the company's plants at Tadanac and the Rossland mines is from the Bonnington plant of the West Kootenay Power & Light Company, its subsidiary. This big plant is now running up to full capacity, and there is hardly any doubt but that extensions will have to be made in the early future, as there is at the present time demand for more power than can be supplied.

One of the progressive steps just achieved is authorization by the legislature of the incorporation of Tadanac. This will bring all of Tadanac under one control. An arrangement is being negotiated whereby the city of Trail and the municipality of Tadanac will enjoy the advantages of consolidated schools, Trail maintaining the schools while Tadanac will contribute to their up-keep something over 50 per cent. of such expense.

It has been said that the Trail smelter is the keystone of mining in the Kootenay, and indeed of British Columbia. While proportionately less custom ore is treated at its plants than formerly, that is simply because the output of the Consolidated's own properties has increased out of proportion to the custom ore.

\* \* \*

In many respects the Trail smelter may be said to be the keystone of mining in Canada as a whole. It is unique in the world as assembling in one group a copper-gold smelter, a silver-lead smelter, a zinc plant, a refinery for the precious metals, an electrolytic copper refinery, and an electrolytic zinc refinery, not to speak of plants concerned with manufactured metal products and important by-products.

#### LETTERS FROM READERS

##### *Industrial Research at Toronto University*

To the Editor

Canadian Mining Journal

Sir:—

Permit me to congratulate you on your persistent effort in the direction of emphasizing the importance of research. Of course there is a large amount of research work going on continually at our mines. What is most needed probably is recognition of this research, which

should be recognized as an important department in every mining organization of consequence.

Your editorial on the Fellowship for Asbestos Research in the issue of January 12th rather indicates that there is no institution for the carrying on of industrial research in Canada. All our universities are carrying on some research work, and some of it is distinctly industrial.

In the University of Toronto within the Faculty of Applied Science and Engineering there is a School of Engineering Research which has been in existence for several years now, and has turned out some very creditable work. The facilities are here, the spirit is here, some trained workers are here—all that is needed is more funds. Consolidated Asbestos, Limited, or other industrial organizations might well establish research fellowships in this School.

Toronto Ont.

H. E. T. Haultain

##### *Commerce and Business Studies at Queen's*

To the Editor

Canadian Mining Journal

Sir:—

My attention has been drawn to an editorial and news item in the *Canadian Mining Journal* for December 22nd. last, which describes the development of business courses in the Technical Engineering Schools of the United States.

I am writing merely to draw your attention to the calendar of courses in Commerce and Administration at Queen's in which there is a graduate option for engineers. You will be interested to know that we have found among practising engineers a very considerable regret that more business courses were not included in the curriculum. Though we have been unable, up to the present, to establish a business option in the Faculty of Applied Science, we have done the next best thing in providing a course of one year's duration for men who have taken an engineering degree in some recognized college. As you may surmise, this is merely a makeshift, as for the most part men do not wish to spend another year in addition to the regular four years. Our registration in these courses has therefore been small, but we trust that in the future more Commerce work may be given within the Engineering School itself. At the present time, one class of two hours a week throughout the entire year in Economics and Business is given to fourth year students, and on the whole I think the tendency is to increase that. As our venture in the Commerce work for engineers is the first attempt, so far as I know, in Canada, to meet this very definite need, I have taken the liberty of calling your attention to it.

Queen's University  
Kingston Ont.

W. A. Mackintosh

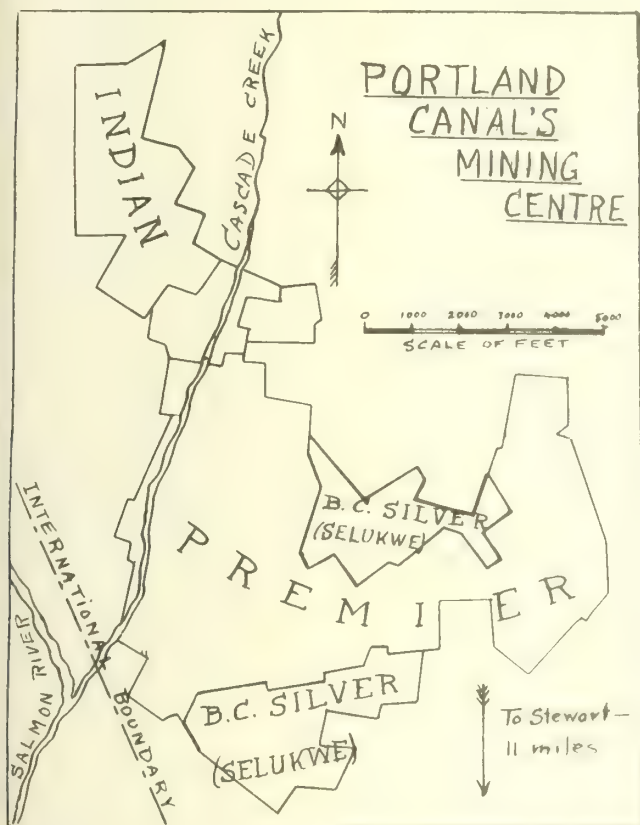
It is reported that all the coal properties and claims controlled by the late Lord Rhondda in Central British Columbia have passed into the hands of British interests organized for colonization work and for the development of natural resources in Western Canada. Some of these properties are situated north of the town of Terrace on the Grand Trunk Pacific Ry., about ninety miles east of the seaport of Prince Rupert. A market for the coal, which it is proposed to develop, may be obtained at Prince Rupert and it also is expected that an export trade to South America may be inaugurated.



# Buoyancy In British Columbia

By ALEXANDER GRAY

Not so long ago a well-informed British Columbia writer on the spot was within the facts when he stated that "another Premier Mine" had been diligently sought but had not been found. Such mines are not an every day occurrence, where structures vary and denudation has wrought havoc with mineral-bearing horizons. The Premier had to convince pioneers, and many of those who had clung to the Portland canal district, that the Bunting brothers and William Dilworth when they made their fortuitous trip in June, 1910, and staked eight Cascade Falls Claims, were in sight of the fortunes that went to Messrs Trites, Wood, Wilson and Neill, together with the Guggenheim interests, Keith, Untermeyer and others.



There was enough for all. The prospectors did not get it. After producing gold and silver to the value of approximately \$8,000,000 and disbursing \$3,100,000 in one year among its practically private owners—for it was not until recently the shares were introduced to the New York Curb — there is sufficient ore in sight to the 700-foot level to make the mine what its name signifies.

The position is so propitious that the owners have acquired other areas in the vicinity. Last year a proposal was made to the Selukwe Gold Mining and Finance Co. of London which controls the British Canadian Silver Mines Corporation, holding 902,000 of the 1,600,000 shares of five shillings each. As only 1,000,007 shares were issued up to a few months ago, the Selukwe Corporation was in absolute control of British Columbia Silver Mines, Ltd., which also holds interests north and south of the Premier, as well as in Bush mines and Salmon Bear River Mining Company Limited.

The Selukwe directors did not entertain the Premier proposal. They contemplated drilling. Really Sir E. H. Dunning is a weatherwise mining director, else he would not have been where he was at the Rand. He and his colleagues of the Selukwe board had not been fortunate in their Selukwe and Kafue-Rhodesian ventures, and they were well advised no doubt by C. A. Bank, M. Inst. M. M., domiciled at Vancouver.

Selukwe had been passive for ten years. Premier Company developments bestirred it, hence this London cable, bearing date January 17th.

A sensational feature on the mining exchange here yesterday was the rise in the 5 shilling shares of the Selukwe Gold Mining Finance Company from 8½ to 15½ shillings. This Rhodesian company also owns properties in British Columbia, and the sudden bound was due to a cable from Vancouver as follows: "Struck veins in crosscut. Large ore body. Undoubtedly main Premier Gold Mining Company vein. I consider it quite satisfactory. Future prospects excellent. Further information by cable later."

The Premier Company referred to in the cable owns adjoining property and is a highly prosperous concern. This cable resulted in a turnover of fully 70,000 shares. Last year these Selukwe shares changed hands at less than a shilling apiece.

If there is a Premier extension as intimated, the Portland Canal section between the Canadian Silver Corporation to and including the Indian Mines areas, now controlled by Montreal and Toronto interests, assumes greater importance. Possibly there is an interruption between the Premier and the Indian, in the Valley of Cascade Creek, but the Indian has the Premier elevation, is in the same horizon, and there is a series of veins with such values that the whole section becomes more than ever attractive. Further developments will be awaited by mining capitalists who understand what it requires to make mines in the Portland Canal district.

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Bearing upon this brief comment on what is transpiring in the Portland Canal country and further to the north, is a sentence that was buried at the end of a paragraph in the last issue of *The Canadian Mining Journal*. It reads:

"It is stated that, in addition to its original claims, it (the Premier Company) now owns, controls, or is interested in some fifty or sixty claims in the Salmon River Valley".

Hence the recurrence of the parable of the Wise and Foolish Virgins. Canadians in general have not known exactly whether Portland Canal is an adjunct to the British penal institution of that name, or is located near the place where they killed the dog for biting the wheel-barrow, in Milesia. Selukwe happened to place "A stack of whites" where a lucky card came out of the box, which already has made a difference of five or six million dollars to Selukwe shareholders, while Foolish Virgins hereabouts have slept or foreswore British Columbia. Yet Schofield, than whom there is no higher authority in the case, and Dr



Harron, have collaborated in a report based upon further investigations made two years or so ago, which substantiate this statement.

The geological conditions which surround the Premier mine, hundreds of miles north and south, along the eastern flank of the Coast Range batholith, and it is most probable that other properties similar to the Premier will be discovered in this large unprospected area.

Regardless of denudation and contentions regarding secondary enrichment, there are other mines in the *Journal*. The *Canadian Mining Journal* correspondent writes that the Wis. Virgins of the Premier Company have kept their lamps trimmed, in view of their increased holdings. Notwithstanding all of which, it is to be borne in mind that Portland Canal is no place for pienes or pink teas.

### PERSONAL AND GENERAL

C. H. MACNUTT has resigned from the superintendency of the Vimy Ridge mine of the Bennett-Martin Asbestos and Chrome Co., and now is with the Asbestos Corporation of Canada, Ltd., in charge of all their mining operations.

HUGH B. GILLIS, superintendent of iron ore mines and quarries for the British Empire Steel Corporation, was in Montreal last week at the head office of the Corporation on account of the virtual cessation of mining operations at Wabana consequent upon the French occupation of the Ruhr district. GEO. D. MACDOUGALL and F. W. GRAY, of the same company, were also in Montreal from Sydney, Nova Scotia.

J. B. TYRRELL addressed the American Association for the Advancement of Science, of which he is a vice-president, in Boston last month. His address, on "Mining in Canada", is published in "Science" of January 12th. It gives a concise, yet comprehensive, view of the history of Canada's various mineral districts, much of it from Mr. Tyrrell's own observation during his lifetime of work from coast to coast. The address concludes with a glimpse into the future of our mining industry, and the suggestion that here lies the field for a host of young men with a sufficiency of energy and ambition and a touch of the pioneering instinct.

MAJOR-GENERAL SIR A. C. MACDONNELL, Commandant of the Royal Military College, Kingston, addressed the Engineers' Society of Western Pennsylvania at Pittsburgh on Monday of this week.

G. C. BATEMAN, manager of La Rose Mines, Cobalt, is sinking the new shaft on the Violet property at a rate of about five feet a day which compares well with the records of the camp.

SIR ROBERT SQUIRES, premier of Newfoundland, is to visit Montreal this week in connection with the recent closing down of the iron ore mines of the British Empire Steel Corporation at Wabana.

M. F. FAIRLIE, manager of the Mining Corporation at Cobalt, has recently returned from a visit of inspection to the Corporation claims in the Lightning River gold area.

HARRY DONALDSON is to resume the direction of operations at the Beaver mine, Cobalt, now being reopened by the Coniagas.

FRASER D. REID, manager of the Coniagas, will act as consulting engineer for the Beaver.

The coal field in the vicinity of St. Georges, on the west coast of Newfoundland, has been sold to an Eng-

lish company, according to report. These seams of coal have been but little explored, but outcrops does not indicate that they will be of great importance. Heretofore coal from Nova Scotia has held the Newfoundland market. The new industrial undertakings on the Humber river, north of St. Georges, may stimulate the development of a local supply of coal even if from thin beds.

The price of lead in New York advanced last week from 7½ to 7¾ cents per pound.

Last year Ontario produced 7.2 per cent. of the world's supply of gold, coming next to the Rand. It is estimated that next year the proportion will be 10 per cent., or 30 million dollars.

U. M. W. A., Local No. 26, Sydney, Nova Scotia, has protested against the proposed importing of skilled coal miners. In the face of Mr. F. W. Gray's recent statement in the *Journal* that the reduced coal output of Nova Scotian mines is due principally to a shortage of skilled miners, this protest should not carry much weight.

The coal seams of New Brunswick are characteristically thin and hard to work, yet they are gradually being developed. Last year's production of 288,000 tons was the highest on record, and operators hope to maintain this gain.

New Brunswickers in Westmoreland county believe that a "blanket lease" held by the New Brunswick Petroleum Company over a large area of oil shale lands in the county is retarding development. They have therefore petitioned the local legislature that this lease be cancelled.

### INTERNATIONAL MINING EXHIBITION, LONDON

The 6th International Mining Exhibition will be held at the Royal Agricultural Hall in June under the Presidency of Sir John Cadman, K. C. M. G., and will be opened on June 1st by the Rt. Hon. Sir Philip Lloyd-Graeme, M. P., President of the Board of Trade.

The Exhibition has the support of all the leading Mining Institutions in Britain and abroad and is receiving widespread support from British firms. The Roumanian, Mexican and Columbian Governments have already taken space, and there will be comprehensive exhibits from France, Belgium, Holland, the Belgian Congo and Zambesia.

The Institution of Petroleum Technologists are organising a series of conferences and it is anticipated that there will be a large attendance of delegates from all parts of the world. Another interesting conference will deal with the question of "Safety in Mines" of which practical demonstrations will be given during the course of the Exhibition.

It is only a century ago since anthracite coal first came into use. At first it was found very difficult to burn, as the attempt was made to use it mixed, in various sizes, as with bituminous coal. It was not until after many years of trial that there was discovered the simple and effective expedient of screening it, when each of the various sizes burns without difficulty.

The French military occupation of the Ruhr coal basin has resulted in both French and German orders for British coal. Both these countries were drawing a very large supply from the Ruhr coal mines, and the interruption of their production, which threatens to be serious, will certainly benefit the British coal mines.

# The Mikado Mine

DESCRIPTION OF THE ATTEMPT NOW UNDER  
WAY TO OPERATE THIS WELL-KNOWN  
OLD PROPERTY ON LAKE OF  
THE WOODS

Many of the "Journal" readers will remember the mild excitement in Eastern Canada when in the nineties, and then spasmodically to within twelve years ago, gold was produced to possibly a total sum of three or four million dollars from the Lake of the Woods and adjoining districts. Gold mining then, to those few who were interested, was looked upon as a pure hit-or-miss gamble and the thought that the industry was really an ordinary commercial industrial enterprise, as fortunately it has become today, never occurred to them. Our people were accustomed to see fortunes made from timber operations, wheat speculations, etc., and looked upon these activities as safe and proper methods of accumulating wealth. Land speculation had preceded and then followed the spasmodic Ontario gold boom, then strictly confined to the Lake of the Woods and adjoining districts (for our Porcupine, Kirk and Lake and contiguous areas were then unknown); and although many fortunes were made from the lumber, wheat and land speculations gold mining was held to be a pure gambler's throw and was treated accordingly.

## *Business Methods Not Used*

That gold mining could be a legitimate commercial enterprise was then unthought of by our people. They had seen towns and cities built up by lumber, wheat and land booms and understood that situation, but they did not realize that towns and cities could owe their foundation and greatness to gold mining. They had not seen, for instance, San Francisco and Johannesburg, which were, among many others, founded, established and made beautiful by the product of the yellow metal as their staple industry.

What was the result? Shrewd business men who, if they had conducted their own successful businesses on the same lines as they conducted their gold mining ventures would soon have been penniless, took "a flyer" with the result that in most cases they lost, or if they gained it was as a result of stock gambling where their profits instead of coming out of the ground (as fortunately is the case with numerous Canadian gold mines today) came out of the pockets of the less fortunate and more gullible public.

Coupled with incompetence and in many cases even rank dishonesty, the gold mining industry in the Lake of the Woods was starved for capital. No serious effort was made to test the deposits at depth. Pocket-mining for high-grade was chiefly indulged in and quartz, and quartz alone, was supposed to be the sole depository of the precious metal.

It must be admitted, however, that the lack of modern mining and milling practice was a contributory cause to the non-success of early gold mining; but even that would have been overcome if cautious business methods, plus adequate capital, had been used as was ordinarily used in other commercial and industrial concerns. No! Gold mining was a simon-pure gamble and had to be treated as such.

The writer has been through it all, has made the same mistakes, and has paid bitterly in money and

heartache for his experience. But now cured? Never! Only more convinced than ever of the permanency and richness of the Lake of the Woods and Northwestern Ontario districts as potential gold producers, and this conviction arises from the knowledge gained in the hard school of experience.

Although anticipating my story, it may perhaps not be out of place as illustrating what I have just written to quote from a report of the Mikado Mine, which I have before me, made by Mr. W. E. Simpson, A.R.S.M.; M.I.M.M. dated from Swastika, Ontario, the 6th November 1922, as follows: — "Underground workings,

— The main vein, called No. 1, on which the greatest amount of work has been done, is almost vertical, but for some unaccountable reason the main working shaft was sunk at an angle of about 25 degrees, requiring some 1800 feet of cable on the hoist drum to raise the ore from a vertical depth of a little more than 400 feet. Possibly this shaft was intended to follow the pitch of the ore-shoot, but it must have been most costly and expensive to operate and, in addition to these disadvantages, it made the extraction of the ore immediately underneath a practical impossibility. Commercial success under conditions such as these could not be expected other than with ore of very great richness."

## *Financing the Present Operation*

The writer worked the Mikado Mine for some ten months nearly twelve years ago (when his money was lost and experience gained). All our efforts then were devoted to underground development work and to the proving up and blocking out of ore-bodies. We were forced to discontinue this work owing to lack of capital. In November, 1921, heartened by the wonderful development in Porcupine and Kirkland Lake and sure in the knowledge that these vein systems, with pay ore, had been proved to depth and realizing that similar geological features were present in the Lake of the Woods district, the writer once more tackled the operation of the Mikado Mine, sure in the knowledge that, given adequate capital, the Mikado would soon take its place amongst the steady gold-producers and dividend-payers of Northern Ontario.

The task was a hard one, for it was next to impossible to secure a sympathetic hearing from the investing public and the usual crop of "knockers" were (for reasons best known to themselves) much in evidence. However, the Mikado property, consisting of 278 acres freehold, plant and equipment, and options on certain adjoining freehold properties were purchased by and vested in the present company, Mikado Consolidated Mines, Limited, with its head office at 292 Imperial Building, Hamilton, Ontario. Sufficient capital being available, active work was undertaken at the mine in June last when a crew of men under Mr. Neil Morrison of Elk Lake, as superintendent, began the task of unwatering No. 1 vein, the present principal working, and cleaning up the mine. The work has proceeded without interruption until the time of writing, is still under way and will continue. At the time of the great fire in Northern Ontario, Mr.



Morris found it necessary to return to Elk Lake, and Mr. Dryden Smith, formerly of the Laurentian Mine (and others) succeeded him as superintendent.

#### *An Engineer's Report*

Later in October last the Directors secured the services of Mr. W. E. Simpson, A.R.S.M.; M.I.M.M. of Swastika, Ontario, to make an examination and report on the mine, so that it might be known what independent professional opinion of the venture was. The result was a long and favourable report, technical and full of detail, which is summed up in Mr. Simpson's own words in his final paragraph:

An examination of the Mikado Mine certainly gives a most favorable impression of its outlook and possibilities. The lowest levels, which in every mine are of greatest importance, here give the best promise of success. In keeping with the experience of all successful mines in Northern Ontario, the schisting and the industrial values tend to increase with depth. The 7th level is certainly better than the 4th, and reports indicate that the 9th, now under water, is better than the 7th. The past difficulty of operation is now being successfully overcome and the enterprise has a number of factors in its favor. Modern machinery and methods of treatment are highly efficient and with adequate financing and experienced management the future of the Mine can be considered as filled with expectations for industrial success. There is nothing spectacular about the ore but, what is infinitely better, the values exposed in the lower workings are what might be called industrially distributed. On the whole therefore, there is every indication that the property can be made to rank with the most successful gold mines of the country. Personally, I consider the mine possessed of excellent possibilities and have every confidence of its ultimate success."

The seventh level development spoken of by Mr. Simpson is the work formerly done by myself and associates twelve years ago and shows two ore-shoots 'one about 50 feet long giving an average assay value of about \$14.00 per ton for an average width of about 8 feet the other about 250 feet long assaying \$19.00 over an average of about 5 feet wide...Further...it would seem that the limit of length has not by any means been reached," to quote Mr. Simpson's report.

#### *The Present Mining Operations*

Following out Mr. Simpson's recommendations for future work on No. 1 vein, the original vertical shaft to a depth of 240 feet, abandoned by the original owners when they constructed the ridiculous incline shaft to take its place, has been re-collared, is being re-timbered, laddered, a new head-frame constructed and generally made ready for use to the 4th level at 240 feet vertical depth. A winze has been sunk in ore from the 4th to the 7th levels commencing at a point approximately 60 feet west from the incline shaft on the 4th level. This winze is vertical for some 80 feet, where it is continued to the 7th level at an angle towards the incline shaft and cuts the seventh level at roughly 240 feet from the incline shaft. This is now being fixed up with ladder-ways as an escapement. When the vertical shaft is completed to the 4th level, the incline shaft will be abandoned to that level. Opposite the vertical shaft in the fourth level and about 400 feet west of the incline shaft, a cross-cut some 20 feet in extent has been made into the hanging wall to cut the

vein. Here a winze has been sunk on the vein to within a few feet of a point where the prolongation of the seventh level drift westward for a distance of some fifty to sixty feet will intersect it. As this is all in ore, the foot-wall will then be cut to join up the vertical shaft to the seventh level and the incline shaft will then be completely abandoned as a working shaft and will only be used as an escapement.

The new vertical shaft to the 7th level and the 7th level itself will be the main artery of the mine until further development makes it necessary and economical to construct a large main working shaft elsewhere.

#### *Projected Development*

It is proposed to drive the 7th level westward until the junction has been made with the fourth level winze, provided the ore-body continues.

A winze will be sunk on the vein in the floor of the 7th level west, which is the deepest developed point. (360 feet vertical) in this portion of the mine, for 100 feet and the vertical shaft continued after the ore body has been proved, and this plan will be followed at this point as long as the vein continues to go down, which we believe will be to a considerable depth.

Cross-cuts on the fourth and seventh levels will be made in both walls to explore certain possibilities which heretofore have remained unexplored. Large bodies of mineralized Keewatin schists, lying next to porphyry dykes, have never been tested or sampled. This will be done systematically. Heretofore only the quartz itself was investigated. A very large tonnage of milling ore may become immediately available if it is proved that the mineralized schists carry profitable gold values.

Other development work has been tentatively projected but until the programme outlined above has been well advanced nothing further will be attempted.

At present there is estimated some half million dollars worth of ore either broken in the mine or blocked out and available for stoping when the mill is put in commission. Information from diamond-drill cores and other sources entitles me to say there is potentially (although not blocked out) a very large amount of ore in the vein system.

Only last week while on new work on the floor of the seventh level rich ore showing free gold was encountered, but while interesting to show that free gold still exists in the lowest workings reached in the mine, it is not what the writer is looking for or depending upon. Rather it is from the large bodies of \$10.00 ore, which we have already proved and are developing but which shows no visible gold, that we expect to make the dividends.

#### *The Milling Plant*

Mr. Simpson has made his report on and recommendations for the remodelling of our milling plant. His object has been to use as much of the old plant as is justifiable from an economic standpoint and to add to it only sufficient modern machinery to enable economical work being done. A ball-mill, Wilfley tables and partial re-modelling of the present cyanide plant is thought sufficient for the present to take care of a 60-ton daily production. The present stamps will be used for coarse crushing for the ball-mill. This plant will be placed in commission about 1st June next and from then on will be used until circumstances warrant



the addition of further units, which will be of an approved type and will be added from time to time as future development warrants.

The main object the management has in view at the present time is underground development, to block out ore reserves to such an extent that, no matter who measures and samples and re-measures and re-samples, the future permanency of the mine for many years of production is assured beyond all question of doubt.

The question of power has yet to be determined. For the moment, steam power from cord-wood is the power used. Modern engines have greatly reduced the fuel consumption and it is estimated that eight cords per day will now accomplish what formerly required twenty. But this is only a temporary measure and the coming summer will see the matter definitely settled, with either hydro-electric power from one of two sources already available, or electric power from oil fuel engines with direct drive (probably under the circumstances the most economical power available) or producer-gas engine.

The present directors are Lt.-Col. H. A. C. Machin, F.R.G.S. of Kenora, Ontario, President; Captain George J. Guy, of Hamilton, Ontario, Vice-President; Major George H. Marsh, of Toronto, Ontario, Secretary-Treasurer; and Messrs. Walter P. Thompson, of Hamilton; J. T. White, K.C., of Toronto, A. H. Dinning, of Detroit, Michigan, and J. C. Stevenson, of Toronto.

H. A. C. MACHIN.

Kenora, Ont.

## CANADIAN GOLD PRODUCTION

### *Reasons for Lack of Interest in London*

Except for Canada and the United States, the gold mining companies of most countries publish very full information as to the monthly working results in detail, many issue quarterly results as to the finances and particulars of the nature of the developments, and several of the more important companies issue maps and plans with their annual reports. Information is afforded by publication in the newspapers and frequently by issue of direct circulars, &c., to the individual shareholders. The great majority of companies have head or branch offices in London. In all this essential information Canada apparently restricts itself to publishing particulars in Canada. Though, it may be, the English shareholders get official reports, &c., the general public in this country is scantily informed as to progress and events, and the Press itself is left much in the cold as to receipt of official reports or announcements.

We are led to bring out these points as we understand there are complaints of difficulty in obtaining information as to the Canadian gold mines now producing in Ontario province. The Hollinger Mine has achieved a world-wide reputation for richness and extent of its ore deposits. Despite the fact that it has \$25,000,000 of capital, any inquiry for information has to be addressed, by persons in Europe, to the company's office in Bay Street, Toronto. Any investments by persons this side of the Atlantic are difficult to affect, and would-be speculative investors are disinclined to take the steps necessary for them to acquire an interest in a share in which there is no ready market here. Careful men want to be furnished with some

readily accessible means of obtaining information as to results being secured, &c.

We have intermittently in recent months called attention to the good discoveries made in the Ontario gold fields. The rate of production of gold is extending and companies are enlarging, or preparing to enlarge their reduction plants. Here, however, scant heed is given to the matter.—The Stock Exchange Gazette (London).

## NITRIC ACID MANUFACTURE IN CANADA

Canada is to have a new and somewhat unusual industry. Two years ago an American company established a small plant, costing approximately \$500,000 at Lake Buntzen, on the north arm of Burrard Inlet, near Vancouver for the extraction of nitrogen from the air by electricity. Two years of operation have proved the practicability and commercial profit of the scheme, and now the company plans an elaborate extension of the plant, at an expenditure of between \$3,000,000 and \$4,000,000, to take care of the production of nitric acid. There is stated to be only one other such plant on the North American continent.

The extension of the present plant for the manufacture of nitric acid has been forced on the company by the recent increase to 600 per cent. in the United States tariff on nitrate products used in making dyestuffs, paints, inks and films which the Buntzen Lake plant has been turning out. As the tariff shuts these products out of their chief market in the United States, nitric acid is to be manufactured, for which there is practically an unlimited market.

On account of the cheap power available it is claimed that the Canadian industry can manufacture nitrates cheaper than they can be imported from South America, which has hitherto been the principal source of supply. In the past fiscal year Canada found it necessary to import from other countries nitrate of soda to the extent of 22,838,208 pounds, worth \$581,907, nitric acid to the extent of 71,643 gallons, worth \$11,456, nitrate of ammonia, 2,017,078 pounds, worth \$127,484, and other nitrates to the extent of \$71,306.

There are immense possibilities to the industry of manufacturing nitrates from the air in Canada. Nitrates form a very important ingredient in fertilizing crops, and Norway utilizes over 300,000 horse-power in manufacturing nitrates in this manner and exports some 60,000 tons of fertilizer. Nitrates form the basic materials of other Canadian industries, and their absolute necessity in the manufacture of munitions is still an important national consideration. With Canada's unexcelled water-power resources the manufacture of nitrates from the air might become an industry of such proportions that the Dominion would take second place to no country in this regard.—From "Industrial and Agricultural Progress in Canada."

The Grass Valley gold field, in Nevada county, California, was during 1922 the most productive quartz-mining district in the state. Its veins are characteristically narrow, with high-grade ore-shoots. The Bridge River gold area, northwest of Lillooet, British Columbia, has been favourably compared with the Grass Valley field by Dr. W. S. McCann, of the Geological Survey, Ottawa. Another Canadian field that resembles it is the Mine Centre area in northwestern Ontario.



# A New Steel Company

ALLOY STEEL MANUFACTURE FROM  
CANADIAN ORES

At Welland, Ontario, there is to be in operation within a few weeks a new and important industry. The Welland Alloy Steel Corporation, Limited, is now actively engaged in preparing for manufacture on a large scale, and its plans envisage operations that will employ in the near distant future upwards of 2,000 men.

The new company has purchased the entire property and stocks of Electric Steel and Metals, Limited, which has been idle for the past two years. The property is on the bank of the Welland Ship Canal, with a frontage of 1300 feet and dockage capacity of the same length, and it will have as well the use of a large ship-turning basin when this shall have been completed by the Department of Public Works.

The highest grades of steel now made in any quantity are the product of the electric furnace. The new company has already in its plant two 7-ton Heroult electric furnaces, with a combined capacity of 30,000 tons a year. This capacity is to be increased to 45,000 tons a year by the addition of a third furnace. It is intended to instal during the present year a rolling plant to turn the ingots from these furnaces into the various shapes required in the trade.

Cheap power for metallurgical purposes is rapidly becoming a thing of the past in the Niagara district. Hence a contract held by the company for their supply of power at a very favourable rate is an important asset. This contract has 37 years still to run, the rate being from \$14.62 to \$15.82 per horsepower-year.

One of the Company's chief assets consists in deposits of nickel ore on the northern part of the Sudbury nickel range, lying between the Levaek Mine, the

Mond Nickel Company's principal ore-deposit, and the Whistle Mine, where the British America Nickel Corporation has a huge reserve of ore. Exploration has showed that the deposits now owned by the Welland Alloy Steel Corporation are high in nickel and low in copper, which suits exactly their purpose of making nickel alloy steel. As this part of the northern edge of the nickel range is not served at present by a railway, a charter has been obtained with liberal terms for the construction of the line needed to connect the end of the steel at Levaek Mine with the Canadian National line at or near Nickelton Junction. The work preliminary to the actual construction of this line has been completed.

The principal purpose of the Welland Alloy Steel Corporation is to manufacture nickel alloy steel from the ore of the Sudbury district, which contains in natural combination the iron and the nickel required for this purpose. The company owns the rights to a patented process whereby these two metals are reduced together direct from the ore, thus not only making use of the iron in the ore, which is usually wasted, but avoiding the expense of separating out the nickel. In the ordinary process of making nickel steel, the nickel is separated at great expense from the other constituents of the ore, refined, and then added to a bath of refined molten steel in the furnace. By means of the new patented process, the nickel and iron are separated together from the ore by a very simple means, the bath of combined metals is refined, and then any other alloying elements required, such as chromium, silicon or manganese, are added. Thus a direct process is



Plant of the Welland Alloy Steel Corporation, Welland, Ont.

substituted for the round-about process now in vogue, at a great saving in expense. The process has been tried out already very thoroughly in small-scale commercial production.

In addition to this special nickel steel it is proposed to manufacture high-grade plain carbon steels, all the products being obtainable from the works in rounds, squares, bars, angles and special shapes, as well as in ingots and billets.

The personnel of the new company's administration are men already thoroughly experienced in the steel industry, and well fitted to direct the new enterprise. They include the following:

G. F. Allerdice, first vice-president of the Brier Hill Steel Company, Youngstown, Ohio. This company operates blast-furnaces, open-hearths, coke plant, blooming mills, merchant mills and sheet mills. It owns its own coal mines and has a fleet of lake cargo boats for ore. It employs between five and six thousand men.

W. H. Devlin, who for twenty years was general superintendent of the Carnegie Mills, Sharon, Pa. This plant is owned by the United States Steel Corporation and employs upwards of 2,000 men.

H. William Sharpe, first vice-president of the Joliet Forge and Steel Company, of Joliet, Ill. The rolling mills and forge shops of this company are owned by the Sharpe family, and have accumulated for the owners a reserve fund of over one million dollars.

G. B. Nisbet, formerly Metallurgical Engineer for the Brier Hill Steel Company.

H. E. Timmerman, Welland, formerly engineer for the Ontario Hydro-Electric Commission.

J. Ferguson Black, Sudbury, mining engineer.

The active management of the company will be in the hands of Messrs. Devlin, Sharpe, Nisbet and Black.

With an ideal location, and a personnel notable for long and successful experience in the steel business, the Welland Alloy Steel Corporation, Limited, commences its operations under most auspicious circumstances.

## OIL FROM COAL

The waning petroleum supply of the country may be supplemented to great extent, according to Charles R. Fettke, Associate Professor of Geology and Mineralogy at Carnegie Institute of Technology, Pittsburgh, by taking the enormous quantities of bituminous coal now being burned in the raw state for steam raising purposes and domestic use, and subjecting it to low temperature carbonization. This process, he says will produce a fuel that is in many respects superior to raw coal, the smoke nuisance of cities will be abated, and valuable by-products will be recovered, which will aid greatly in augmenting a petroleum supply that is being rapidly depleted. Professor Fettke emphasizes the warning in his report, that the unmined reserves of petroleum are being so rapidly reduced that one of the problems that will have to be faced within the next decade or two will be to find substitutes in continually growing amounts for the products now obtained from it.

"The distillation of oils from oil shales, another important source of supply, will be restricted to those regions where enormous quantities of the shales are found," says Professor Fettke. "Where bituminous coal is found in larger quantities than shale, it will

be more economical to confine the business of oil distillation to coal.

"With the growing shortage of natural gas and anthracite coal and their consequent increase in price, other sources of domestic fuel must come more and more into use. One of these will undoubtedly be low-temperature coke. The low-temperature carbonization of coal in this respect will have the advantage of the oil shale industry. It will yield a valuable fuel as a residue while the spent shale from the latter not only has little or no economic value, but means will have to be provided for its disposal."

## AN AUSTRALIAN ASBESTOS QUARRY AND MILL

A small asbestos quarry and mill now operating in New South Wales, Australia, on Mount Fibro 11 miles east of Barraba, are described in the December issue of *Chemical Engineering and Mining Review*, Melbourne. The Asbestos Mining Company of Australia, Limited, was formed in 1918 to open up the deposits and has continued to operate since that time.

The asbestos fibre occurs in a belt of serpentine a quarter of a mile in width, and has been shown to be present throughout at least three-quarters of a mile of its length. White silky fibres are found in a network of seams in the serpentine, these seams being from  $\frac{1}{4}$  to  $1\frac{1}{2}$  inch in width, with an average of  $\frac{3}{4}$  inch. The fibre in these seams is usually divided by a line of parting, making them shorter than the full width. In places there is found a "ribbon" structure showing as many as 120 bands to the foot. Seams of magnesite occur characteristically with the seams of chrysotile asbestos.

The asbestos rock is quarried from an open pit, and over half is rejected as waste. The remainder is treated in a mill very similar to some in the Thetford, Quebec, asbestos area. It is crushed in a gyratory crusher, and then in rolls. A trommel removes material under 12-mesh, which is discarded.

The oversize, after drying, is reduced to one-eighth inch in rolls and again screened, on a shaking table covered with 9-mesh wire cloth. The undersize is discarded and the oversize treated in a Jenke's fibreizer, which is a cylinder 8 ft. long by 3 ft. in which revolves a shaft carrying 11 pairs of beaters rotating at 300 r.p.m. The beater arms are set diagonally, to carry the pulp forward to the discharge end. After the undersize (sand) is separated on shaking screens, the beaten fibre is collected by suction off shaking tables.

The amount of fibre recovered is 5.75 per cent.

The mineral production of Utah increased from \$22,023,000 in 1921 to \$39,738,000 in 1922. There was a record production of silver, 16,800,000 ounces, an increase of more than 4,500,000 over 1921. Copper produced in 1922 was 95,500,000 pounds valued at \$12,797,000, against 30,891,000 pounds worth \$3,985,000 in 1921. The Utah Copper Co., produced over 10,000,000 pounds a month during the third quarter of the year, which is about half its maximum capacity.

Australia imports from £6,000,000 to £8,000,000 worth of fuel oil annually. This has stimulated a very active search for oil throughout the Commonwealth, which has been so far unsuccessful.



## IRON ORE PRODUCED IN UNITED STATES IN 1922

### INCREASE IN OUTPUT AND VALUE

The iron ore mined in the United States in 1922, exclusive of ore that contained more than 5.5 per cent. of manganese, is estimated at 46,963,000 gross tons, an increase of 60 per cent. as compared with that mined in 1921. The ore shipped from the mines in 1922 is estimated at 50,046,000 gross tons, valued at \$158,222,000, an increase of 88 per cent. in quantity and of 76 per cent. in value as compared with the figures for 1921. The average value of the ore per gross ton at the mines in 1922 is estimated at \$3.16; in 1921 it was \$3.37. The stocks of iron ore at the mines, mainly in Michigan and Minnesota, apparently decreased from 13,836,267 gross tons in 1921 to 10,699,000 tons in 1922, or 23 per cent.

These estimates, which are based on preliminary figures furnished by producers of 98 per cent. of the normal output of iron ore, were made by Hubert W. Davis, of the United States Geological Survey, Department of the Interior. They show the totals for the principal iron-ore producing States, and, by grouping together certain States, the totals for the Lake Superior district and for groups of southeastern and northeastern States.

### Lake Superior District

About 86 per cent. of the iron ore shipped in 1922 came from the Lake Superior district, in which 39,602,000 gross tons was mined and 43,095,000 tons was shipped, increases of about 58 and 89 per cent. respectively, as compared with the quantities mined and shipped in 1921. The ore shipped in 1922 was valued at \$145,150,000, an increase of about 78 per cent. These totals include the ore mined and shipped from the Mayville and the Baraboo mines in Wisconsin and ore shipped by rail as well as by water from all mines, but exclude manganese ores that contained more than 5.5 per cent. manganese. The ore is chiefly hematite. The stocks of iron ore in this district apparently decreased from 12,574,457 gross tons in 1921 to about 9,034,000 tons in 1922, or 28 per cent. The shipments of iron ore by water from the Lake Superior district in 1922 (including manganese iron ore), according to figures compiled by the Lake Superior Iron Ore Association, amounted to 42,613,184 gross tons, an increase of 91 per cent. as compared with these shipments in 1921. The average value of the ore at the mines in the Lake Superior district in 1922 per gross ton was \$3.75; in 1921 it was \$3.58.

The mines in Minnesota furnished 70 per cent. of the total iron ore shipped from the Lake Superior district in 1922 and 60 per cent. of the total of the United States. The mines in Michigan furnished 29 per cent. of the Lake shipments and 25 per cent. of the grand total.

### Southeastern States

The Southeastern States, which constitute the second largest iron-ore producing area, including the Birmingham and Chattanooga districts, mined 5,384,000 gross tons of iron ore in 1922, an increase of 80 per cent. as compared with 1921. The shipments of ore from these States to blast furnaces in 1922 amounted to 5,372,000 gross tons, valued at \$9,901,000, an increase in quantity of 84 per cent. and in value of 85 per cent. as compared with the quantity and value of shipments in the previous year. The ore contains about 78 per cent. of hematite, 21 per cent. of brown ore, and 1 per cent. of magnetite. The average value of the ore in these States in 1922 per gross ton was \$1.84; in 1921 it was \$1.83.

### Northeastern States

The Northeastern States, which include New Jersey, New York, and Pennsylvania, in 1922 mined 1,413,000 gross tons of iron ore and shipped 1,015,000 gross tons, an increase of 109 per cent. in the quantity mined and of 113 per cent. in the quantity shipped in 1921. The average value of the ore in these States in 1922 per gross ton was \$2.03; in 1921 it was \$3.75. Most of this ore is magnetite.

### Imports and Exports

The imports of iron ore from January 1 to September 21, 1922, amounted to 684,387 gross tons, valued at \$2,894,496, or \$4.23 a ton. The imports for the year 1921 were 315,768 gross tons valued at \$1,075,909 or \$3.41 a ton. The exports of iron ore for the eleven months ending November 30, 1922, amounted to 602,095 tons, valued at \$2,770,160, or \$4.60 a ton, as compared with exports for the entire year 1921 of 440,106 tons, valued at \$2,077,620, or \$4.72 a ton.

### Pig Iron

The production in 1922 of coke and anthracite pig iron and blast-furnace ferroalloys, according to the Iron Age, was 26,880,383 gross tons, an increase of 62 per cent. over the output in 1921, which was 16,543,686 gross tons.

In speaking recently of the world's unexploited resources of petroleum, Sir John Cadman drew attention to the facts that Mexico's huge production has come from a narrow strip of land along the coast, whereas most of the interior is underlain by petroliferous measures; that the output of the United States is still increasing; that "cracking" methods are making possible a higher yield of motor spirit, and will probably be much further improved; that certain old fields will renew their youth and that many new fields will be found; and that soon coal will be made to yield its oil before being burned.

In 1914 Sir William Ramsay suggested that coal should be gasified underground, without removing it from the seams, and the gaseous fuel conducted to the surface. Experiments made recently in Italy on a bed of lignite serve to indicate that, at least with coal of this quality, the method has some chances of practical success.

It is reported in Sydney, Nova Scotia, that negotiations for a schooner to take an expedition to the Labrador "gold fields" early in February are being conducted here by an agent acting on behalf of a company of Glace Bay adventurers. Sydney men are also planning trips to Stag Bay, but they have no intention of setting out for the rock-ribbed coast before July 1st.

With the record of being one of the two copper companies in the British Empire which kept in operation following the after war slump, the Granby Consolidated Mining and Smelting and Power Company at Anyox, B.C. is now preparing for an extensive addition to the present plant. Construction has already started on one of the largest multiple arch storage dams on the American continent to provide them with a storage dam for power purposes. The new dam is costing approximately \$500,000, and when completed will take care of 32,000 acre-feet of water.



# The Mining Districts

BY THE JOURNAL'S CORRESPONDENTS.

## NORTHERN ONTARIO

**POWER FOR HOLLINGER.**—Hollinger representatives are again meeting officials of the Government in order to take up the question of power development on the Abitibi River, and to see just what terms the Hollinger can obtain. The most important point in dispute seems to be the fact that the Abitibi Power & Paper Company, who have made extensive improvements on the river, only use the water six days a week, while the Hollinger wishes to develop power for the full seven days. The Abitibi Company has made large expenditures in improving the river and developing its own power, and has added to the value of developments lower down the river. The company claims it should be given consideration on account of the improvements made and also because of its intention to expand its plants. The Hollinger, however, wants power rights free of any encumbrance. The Northern Canada Power Company has presented a memorandum to the Government, stating that the Government should not interfere between litigants. The appeal of the Hollinger against the decision in its suit for damages is still pending, as is also the Northern Canada Power Company's action to have the Hollinger sign a contract for all its power requirements.

**SPECTACULAR SHOWING AT KEELEY.**—In the No. 26 vein to the Keeley Mine in South Lorrain, the most spectacular discovery of silver ore ever seen in this country was recently made. The present face shows a width of 5 feet of solid ore across the top of the drift and 4 feet at the bottom, and it is stated that the ore runs approximately 7000 ounces to the ton. The face will not be disturbed until officials of the Bureau of Mines have had an opportunity of photographing it. The recent estimate of 1,500,000 ounces in reserve at the Keeley is already out of date, as this figure has been greatly exceeded. Production for 1922 amounted to 770,000 ounces, as compared with 313,000 for 8 months of 1921. Production in December was 79,000 ounces, but on account of this last big discovery January, no doubt, will be very much higher.

**ROUYN GOLD PROSPECTS.**—Companies operating in the Township of Rouyn, Quebec, are preparing to bring in machinery over the recently completed winter road. Cockeram claims, which are under option to Jack Hammel and associates, will be diamond drilled, and the contract has already been let. Two drills will be sent in shortly. The Thomson-Chadbourne syndicate is bringing in a mining plant to start sinking on the Powell claim. It is stated that on this claim one section of the vein has been opened up for a length of 400 feet, and averages \$12.00 over a width of 6 feet. This syndicate has recently made a payment of \$7,000 on the Miller-Horne group, and controls a length of about two miles on the vein.

**BRANCH RAILWAY SURVEY.**—T. & N. O. engineers have commenced to survey the projected branch line from Swastika through the Kirkland, Argonaut and Gauthier sections, and will probably carry the surveys to the Quebec boundary. Crown Reserve developments

at Pancake Lake are understood to be very satisfactory. The Argonaut has recently found good values on the 500-foot level.

**BALDWIN.**—The recent discovery on the Baldwin property, Boston Creek area, has been drifted on for about fifty feet, and is stated to give satisfactory assays.

**RECEIVERS OF STOLEN GOLD ACQUITTED.**—A good deal of resentment is felt in Northern Ontario over the recent acquittal of R. Kleiser and Leslie Donnelly, who were arrested in connection with the theft of precipitates from the Kirkland Lake Gold Mines. Donnelly is a manufacturing jeweller, who melted down the precipitates and acknowledged having received precipitates of a gross value of \$17,500, for which he paid \$15,119. When asked for a reason for his frequent trips to Haileybury to receive the material, he stated that he was working hard and took these trips for relaxation. He stated that the vendor of the precipitates had told that he and others were interested in a mining property in Kirkland Lake, and that on account of trouble between him and his partners, the precipitates had to be treated privately. Kleiser was tried before a Jury and stated that he had sold gold to the value of \$3,800, which he stated he had received from Ed. Dean. He held out \$360, and stated this sum was on account of his efforts in financing the Reliance property in Cobalt, of which Dean was one of the lessees. Dean and Beswick, the other two men who were arrested in connection with the same series of thefts, will come up for trial at New Liskeard on January 29th.

**FATAL ACCIDENT.**—A most unusual accident at the Tough-Oakes Mine of the Kirkland Lake Proprietary, resulted, a few days ago, in the death of Hilary MacAlindan and the narrow escape of two others. MacAlindan, with his partners, was loading a round of holes in the back of a stope, and were over a chute which had been hung up. The arch suddenly gave way and MacAlindan was drawn down the chute and buried in about ten feet of rock. He did not seem to be very seriously injured and his partners were able to communicate with him. He soon stated, however, that he was burning and asked for water to be poured down to put out his carbide lamp. One of the men went to get the water, and when climbing up the ladder with a pail, fell a distance of 25 feet, breaking his arm and two ribs, and before a sufficient supply of water could be obtained, MacAlindan had apparently died. When the body was recovered it was found he had broken his arm, but death was caused by a very severe burn in his thigh, from the carbide lamp.

**PORCUPINE.**—Orders have been closed for two very large crushers for the Hollinger mine. Officials of the company have stated that the expected dividend increase will not materialize until the question of power is settled.

Dome officials state that no increase in milling capacity is anticipated for the present, and that production will be maintained at about 1100 tons per day. Underground development on the lower levels is stated to be very satisfactory. In order to maintain the present output, the Dome finds it necessary to use its steam plant.



A new company, called the Northern Mineral Lands Corporation, with a capital of \$5,000,000, has been formed by interests connected with the Premier Paymaster Mines in Porcupine and the Crystal Copper Company of Butte, Montana. The new company will take over a group of claims adjoining the Paymaster, and it is stated that the vein system of the Paymaster is believed to extend into this ground. In the same section the Clifton is preparing to continue its shaft to a depth of 600 feet. The treasury has been filled to the extent of \$75,000 by the underwriting of 250,000 shares of treasury stock at 30 cents.

The Hollinger has made a further payment of \$296,250 on account of the purchase price of the Schumacher Gold Mines. This will probably be followed by another distribution of 25 cents a share by the Schumacher. The total amount distributed to Schumacher shareholders probably not exceed 83 cents a share. The purchase price amounted to 89½ cents a share, but as there were some debts to be paid off, this, together with the cost of distribution of the money to the Schumacher shareholders, will be deducted.

The Holtrex Gold Mines is arranging to purchase a mining plant. A shaft has been sunk by hand to a depth of 40 feet, and this will be continued for several hundred feet.

It is expected that the power from Indian Chutes on the Montreal River will reach Porcupine next April, and until power from that source is available the Davidson will discontinue underground work. Diamond drilling will be carried on in the meantime. Two holes are now being drilled, which will reach a depth of approximately 2000 feet. The company recently announced that favorable results had been met with.

**LIGHTNING RIVER.**—The Mining Corporation has decided to drill its claims in the Lightning River district. Surface exploration has been carried on for the past year, and two wide mineralized zones have been encountered, which carry encouraging values. Sinking is also being carried on by the Abitibi Gold Mines on their claims, which are close to the properties that the Mining Corporation have under option.

**CONIAGAS-BEAVER AGREEMENT.**—The Beaver company has announced the terms of the agreement made with the Coniagas, under which the latter company will operate the Beaver, Badger and Prince-Davis properties at Cobalt. The Beaver plant will be put in shape by the Coniagas at its own expense and mining operations will be carried on by the latter company. After deducting the actual expenses of mining and milling, the profit derived from operations on the Beaver property will be equally divided between the two companies. The Coniagas also undertakes to carry on development work on the Prince-Davis and Badger properties by the extension of the Beaver working, and the Beaver is to receive 10 per cent. of the net profits from any ore recovered from these properties, or from any other properties worked through the Beaver shaft. The agreement extends for a period of ten years, with the privilege of renewal for another ten years.

Returns to the United States Geological Survey indicate an anthracite output during 1922 of 52,000,000 tons, against 90,000,000 tons for 1921, the 23 weeks' strike being responsible for the difference.

## BRITISH COLUMBIA

**ADDRESSES BY RESIDENT ENGINEERS.**—Instructions have been given the Resident Mining Engineers of the six Mineral Survey Districts of British Columbia to arrange to address the Vancouver Chamber of Mines should their itineraries take them to that city or thereabout in the course of the next few months. This step was taken by Hon. Wm. Sloan, Minister of Mines, in compliance with a request from the Chamber of Mines for assistance in connection with the preparation of its winter programme. Wm. M. Brewer, of Nanaimo, already has told the story of mining development in the Vancouver Island and nearby mainland zones to a Vancouver audience. He is to be followed by John D. Gallowsay, of the Northeast Survey District, who now is visiting Victoria and who will devote much of his time to impressions of present conditions and the future of the Cedar Creek placer gold discoveries. A. W. Davis, of the Central Survey District, headquarters Kamloops B. C., will appear before the Chamber in the course of a few weeks. Mr. Davis was appointed to this position last year, succeeding the late R. W. Thomson. He is a returned soldier as well as a competent and energetic mining engineer. At the front he worked up to the rank of Major and his services were recognized by decorations. In British Columbia he has been in the employ of the Consolidated Mining & Smelting Co., is well known to most mine operators, and since receiving his present appointment has taken hold with enthusiasm and encouraging optimism. It will be interesting to hear what Mr. Davis has to say of the mineral possibilities of the great central district of which he has been given supervision, in the way of mining, by the Provincial Government. P. B. Freeland, of the Boundary District; A. G. Langley, of the Kootenays; and George Clothier, of the northwest, where flourishes the great Premier Mine, no doubt will be coming to the Coast later on and Vancouver mining men probably will have the opportunity of listening to talks on their various districts before the lecture programme of the Chamber of Mines concludes.

**HYDRAULIC MINING FOR SILVER.**—With reference to the Slocan District, of the Kootenays, there are few who know that silver once was mined by the hydraulicking process in that section. The Minister of Mines' Report for 1897 is authority for this statement, a report by William A. Carlyle, then provincial mineralogist, containing the following interesting account of the operations of the Wonderful Mine. "The Wonderful, 34.50 acres, Crown Grant, and the Lookout and Columbus mineral locations, situated on the mountain slope about one mile west of the Ruth and Slocan Star and south of the branch of Carpenter Creek, are owned by the Wonderful Group Mining Co. The mining operations conducted during the past season on the Wonderful were unique. The property had been under bond to Jno. A. Finch, who had done over 2,000 feet of underground work, mostly along the supposed course of a vein, but with not very successful results, only two carloads of ore being shipped from these working in 1895. Ore was found scattered through the wash and the much shattered shales near the surface so the company decided to prospect the claim by bringing water from one of the small streams in a flume and then letting it cut its way down through the wash to bed-rock as it rushed down the mountain side to Miller Creek. Water was turned on on June 18th and it was found that pieces



of galena ore were being left in the bottom of the cut, and this prospecting then developed into hydraulic mining, the water being allowed to run for several hours, when there would be a "clean up" of tons of high-grade ore, with the result that over \$25,000 were thus won. As the work proceeded it was seen that the mineral-bearing wash or debris was not more than 100 to 120 feet wide while the real "pay dirt" had a much less width than this. It was seen in the cut that as the channel wore down it left on either side country rock apparently in place. In the pay dirt there was not only the solid ore but much decomposed mineral, all of which latter of course was swept away, only the boulders of galena, perhaps with the surface decomposed, remaining, one block of solid galena weighing over 13 cwt. While some believed that the ore had been brought down from the vein higher up on the mountain side, the fact that this ore was found only in a narrow channel, and that immediately above the slope of the mountain ran back with a gentle rise, led to the belief that the washing was being done very close to the vein, if not immediately above it, and this conclusion has apparently been confirmed, as this washing is now reported by the manager to have disclosed the solid vein in place, with a strike S. W. and N. E., and regular underground mining has begun." If these unusual conditions have since been explained the reports do not seem to give the explanation. The circumstances, however, are a good illustration of the richness of the ore of the famous Slocan and are of special interest at the moment because of the expressed opinion of A. G. Langley, resident mining engineer, and other mining men that this District's revival has only commenced and that it will be heard from to some purpose in the course of the next few years.

**AN APPEAL ON BEHALF OF PROSPECTORS.**—Addressing a joint meeting of the Vancouver Chamber of Mines and the Canadian Institute of Mining and Metallurgy, it was stated recently by George W. E. Winkler, an operator of Victoria, that there are but 700 prospectors in this Province and that this number would continue to shrink if business men did not wake up to the situation. It was necessary to find work for them in the winter. A tentative suggestion made by Mr. Winkler was that a syndicate or company of business men be formed, each member of which would put up \$50 or \$100 a year, and that from these funds from eight to ten selected prospectors be put in the field each season with an adviser who would have sufficient knowledge of mining to know when to proceed with the development of a prospect. The amalgamation of the Prospector's Association with the Vancouver Chamber of Mines was urged, it being contended that a central organization could do good work in teaching the prospector more of mineralogy, geology and how to read the maps of the Geological Survey that are issued for his benefit.

**NEW PLACER FIND REPORTED.**—There are reports of another placer gold find in the vicinity of the 150-Mile House, Cariboo District. It is said that men have turned up nuggets while digging for water. A considerable area of ground has been staked. Further particulars are being awaited with interest.

**YUKON SILVER AND GOLD.**—A Dawson press despatch states that the Keno Hill silver camp, which last year shipped \$750,000 worth of silver ore, will produce this winter about \$1,500,000, the greater part of which will come from two mines. Last year's gold yield from the Yukon Territory is put at \$1,000,000 and it is estimated that there are resources to permit the continuation of

this for the next twenty or more years. The total gold produced by the Yukon to date is \$210,000,000.

**DRUM LUMMON TO SHIP.**—The Drum Lummon Mine, Hartley Sound, northwest coast of British Columbia, will be producing 3,000 tons of ore a month within a few weeks, according to Glenville A. Collins, engineer in charge and president of the Company. The ore, carrying values in copper, gold and silver, will go to the Anyox Smelter, Granby Consolidated Mining & Smelting Co. D. J. Williams, formerly of the Rocher de Boule Mine, Hazelton, is expected to become general superintendent of the Drum Lummon. Since last May there have been 30 men employed at the mine and \$60,000 has been spent on development and equipment. A 1100-foot wharf has been constructed, three quarters of a mile of standard gauge railway has been completed, a half-mile aerial tramway has been installed and a 120 horse-power compressor plant installed.

**PROMISING PROSPECT IN USK DISTRICT.**—Douglas M. McKay, mining engineer, of the Utah Consolidated Mining Co., Park City, Utah, is quoted as stating that conditions for mining in the northern British Columbia district of which the town of Usk is the centre are favorable. This is the section through which the Grand Trunk Pacific Ry. runs. Mr. McKay visited Usk last summer, investigating the mineral holdings of the Kleanza Co. Ltd. He says that prospecting and mining here have been impeded during the past twenty five years because of lack of transportation. This now is remedied and Mr. McKay expects that capital will be available for the exploitation of the district's resources because "they deserve it." No mines have been opened up and worked at a profit yet, but Mr. McKay expresses the opinion that the Kleanza Co's holdings, consisting of fifteen claims, should have further development. The values carried in the veins are gold, silver, and copper which all are in the sulphides, the quartz gangue being barren. He continues: "The ore is quite high-grade and more work ought to be done to determine the nature of it and to trace the fissures. At present they are exposed for only a few feet. The ore, if found in quantity, will be of a milling grade and will be susceptible to concentration."

**PROTEST AGAINST CHARGE OF COPPER DUTIES.**—Fred A. Starkey, commissioner of the Eastern Boards of Trade of British Columbia, has voiced the opposition of that organization to the suggested admission of copper wire bars to Canada free of duty "under all and any circumstances", instead of only when such materials are for use in the importer's own factory. The position is taken that such a policy would have the effect of cutting the feet from under the copper industry of British Columbia. Wire requirements are said to constitute the greater part of Canada's copper consumption and to place it on the free list would be a serious blow to refining in the Canadian West. Mr. Starkey's wire follows: "Strongly protest against concession being granted to eastern manufacturers admitting copper wire free. Should such unwarranted favors be granted eastern factories, copper refining in British Columbia will be utterly destroyed. If government would grant adequate protection to manufacturing of copper rods, it would result in 500 additional employees being given steady work."

**COAL MINE CLOSED.**—No. 5 Mine, Cumberland, Canadian Collieries (D) Ltd. has been closed down. Temporarily there will be no production from these workings, although the mine plant and equipment will be kept in condition for the resumption of operations when conditions warrant it.



## NOVA SCOTIA

**WABANA OPERATIONS CURTAILED.**—A few weeks ago we reported the iron ore industry of Wabana, Newfoundland, to be in a flourishing condition, with good prospects for the current year. But the war cloud has lowered and cast its darkest shadow over the horizon with harmful effect. It is stated that the German ore contract with the British Empire Steel Corporation has been cancelled. Let us hope that this is not so, but marks only an interval pending readjustment of the conditions between France and Germany. As it is, it will effect the iron ore mines of Newfoundland and throw hundreds of men out of work during the winter months.

The preparations for the year's output of ore are usually made in the winter season when shipping is quiet; but it was the intention this year to develop the mines and stock a larger quantity of ore than usual, which would have given employment to a greater number of men. However, "the best laid plans of mice and men gang aft agley" and this is only one other plan gone that way.

**NEW ORDER FOR RAILS.**—The British Empire Steel Corporation, after finishing an order of twenty-five thousand tons of one-hundred pound rails, has begun work on some for their own use. They were not quite finished when a new order for twenty-five thousand tons of eighty-five pound rails was received from the Canadian National Railways. This will help out the labor situation, as it was beginning to be feared that several hundred steel workers might be laid idle again.

**COLLIERIES BUSY.**—Despite snow storms, the Nova Scotia collieries have got away to a good start in 1923 and the output of January up to the present is double that of last year. The average daily output is over four-

teen thousand tons, while it was only seven thousand tons in January 1922. A new record since pre-war days was made lately when the output bordered on sixteen thousand tons. Several of the collieries are double-shifted, while much development work is going on in many of the others.

**ELECTRIC MINE EQUIPMENT.**—No. 24 Colliery, the first coal mine in Cape Breton to be fully electrified, is giving good results. The electric coil-cutting machines are proving a success, and the output is rapidly increasing. The experience gained in this mine, whose rise working lie near the surface, will be of great benefit when electric motive power is introduced into the deeper collieries.

If one may judge from the rumors afloat, a Cape Breton company will begin the making of salt this year by the process of evaporation, the gold mines may see a better year, and a new industry to mine torbinite may be started up. The oil of this last mineral is said to be in greater quantity than in shale.

Official preliminary report of metal production in California during 1922 indicate a total value of \$21,625,600, an increase of \$673,000 over that of 1921. Gold production, which was diminished somewhat by the disastrous fire at the Argonaut mine, was \$14,845,000, which is \$860,000 less than in 1921. The yield of silver was 3,181,200 ounces, which is a reduction of 448,000 ounces from the 1921 production.

In common with the other Anglo-Saxon nations, Australia has established a bureau for the establishment of standards, the Commonwealth Engineering Standards Association.

## INDEX TO MINE AND MILL SUPPLIES

Addresses of advertisers whose names appear in the following classified index, may be found upon reference to their advertisements. An alphabetical index to advertisers will be found on the page facing the inside back cover. The following regulations apply to all advertisers:—One-eighth page, every issue, three headings; one-quarter page, every issue, six headings; one half page, every issue, six headings; one half page, every issue, twelve headings; full page, every issue, twenty-four headings. Buyers who are unable to find in the classification heregiven such machinery or supplies as they desire are invited to write Service Dept., Canadian Mining Journal, Gardenvale, Que., who can in all probability, refer them to proper sources.

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The Preparation, Transportation and Combustion of Powdered Coal, by John Blizard.
- Road Materials along the St. Lawrence River, from Quebec Boundary to Cardinal, Ont., by R. H. Picher.
- Building and Ornamental Stones of Canada (British Columbia.) Vol. V., by W. A. Parks, Ph. D.
- Barium and Strontium in Canada, by H. S. Spence.  
The Coalfields and Coal Industry of Eastern Canada, by F. W. Gray.
- The Value of Peat Fuel for the Generation of Steam, by J. Blizard, B. Sc.
- Analyses of Canadian Fuels. Parts I to V, by E. Stansfield M. Sc., and J. H. H. Nicolls, M. Sc.
- Graphite by H. S. Spence.
- Gas Producer Trials with Alberta Coals, by J. Blizard and E. S. Malloch.
- Summary Report of the Mines Branch, 1920.  
The Mines Branch maintains the following laboratories in which investigations are made with a view to assisting in the development of the general mining industry of Canada:—
- Fuel Testing Laboratory.**—Testing value of Canadian fuels for steam raising and production of power gas; analyses, and other chemical and physical examinations of solid, liquid and gaseous fuels are also made.
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- Structural Materials Laboratory.**—Experimental work on sands, cements and limes is also undertaken.
- Applications for reports and particulars** relative to having investigations made in the several laboratories should be addressed to **The Director, Mines Branch, Department of Mines, Ottawa.**
- Summary Report.** The annual Summary Report of the Geological Survey is now printed in parts. Applicants should, therefore, state what particular geologist report is required, or what subject they are interested in.
- Memoir 108.** The Mackenzie River Basin, by Charles Camsell and Wyatt Malcolm.

### GEOLOGICAL SURVEY

#### Recent Publications

- Memoir 119.** The Reed-Wekusko Map-Area, Northern Manitoba, by F. J. Alcock.
- Memoir 121.** The Malagash Salt Deposit, Cumberland County, N. S., by A. O. Hayes.
- Memoir 123.** Sixtymile and Ladue Rivers Area, Yukon, by W. E. Cockfield.
- Memoir 125.** Sedimentation of the Fraser River data, by W. A. Johnston.
- Memoir 127.** Beauceville map-area, Quebec, by B. R. McKay.
- Memoir 128.** Winnipegosis and Upper Whitemouth River areas, Manitoba, Pleistocene and Recent deposits, by W. A. Johnston.
- Memoir 130.** Geology and mineral deposits of the Bridge River map-area, British Columbia, by W. S. McCann.
- Memoir 131.** Kenogami, Round and Larder Lake areas, Timiskaming district, Ontario, by H. C. Cooke.
- Map 1585.** Mackenzie River basin, 1922 edition. Geology.
- Map 1751.** Wainwright, Alberta. Topography.
- Map 1752.** Monitor, Alberta and Saskatchewan. Topography.
- Map 1754.** Upper Elk and Highwood rivers, British Columbia and Alberta. Topography.
- Map 1829.** Salmon River area, Portland Canal mining division, B. C. Geology.
- Map 1831.** Vegreville; townships 47 to 55, ranges 11 to 10 west of the 4th meridian, Alberta. Topography.
- Map 1835.** Beauceville, Beauce county, Quebec. Geology.
- Map 1836.** Explored routes in a belt traversed by the Canadian National Railways between Longlac and Nipigon, Ontario. Geology.
- Map 1860.** Keno Hill area, Mayo district, Yukon. Geology.
- Map 1882.** Bridge River, B. C. Geology.
- Map 1901.** Upper Kitzault valley, B. C. Geology.
- Map 1948.** Wanapitei Lake area, Ont. Geology.
- Applicants for publications not listed above should mention the precise area concerning which information desired.
- The Geological Survey will, under certain limitations, give information and advice upon subjects relating to general and economic geology. Mineral and rock specimens, when accompanied by definite statements of localities, will be examined and their nature reported upon.
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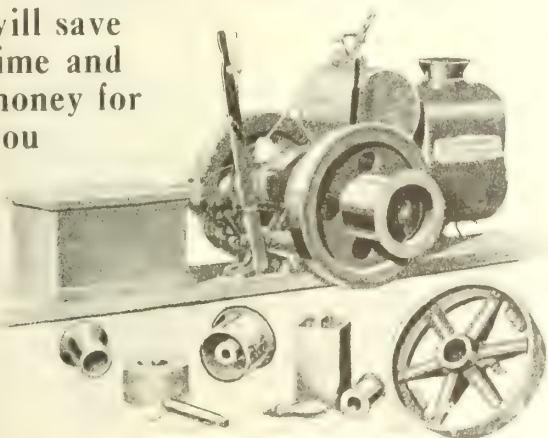
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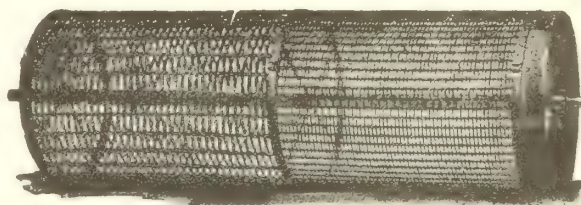
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# Ontario's



# Minerals

PROVINCE OF ONTARIO

DEPARTMENT OF MINES

HON H. MILLS, Minister of Mines

## Mineral Areas.

Ontario, with its 407,262 square miles, contains many millions of acres in which the geological formations are favorable for the occurrence of minerals, 70 per cent of the area being underlain by rocks of pre-Cambrian age. The phenomenally rich silver mines of Cobalt occur in these rocks; so also do the far-famed nickel-copper deposits of Sudbury, the gold of Porcupine and Kirkland Lake, and the iron ore of Magpie and Moose Mountain mines.

## Economic Minerals.

In addition to the above, practically all economic minerals (coal and tin excepted) are found in Ontario:—actinolite, apatite, arsenic, asbestos, cobalt, corundum, feldspar, fluor-spar, graphite, gypsum, iron pyrites, lead, mica, molybdenite, natural gas, palladium, petroleum, platinum, quartz, salt, tale and zinc. This Province has the largest deposits on the continent of tale, feldspar, mica and graphite.

Building materials, such as ornamental marble, limestone, sandstone, granite, trap, sand and gravel, lime, portland cement, brick and tile, meet every demand.

## Mineral Production.

Preliminary returns show the output of the mines and metallurgical works of the Province for the year 1921 to be worth \$48,128,387, of which the metallic production was \$27,574,202.

The following figures show the rapid growth of Ontario's mineral industry by five-year periods since 1891:

| Year.          | Value.      | Year.          | Value.       |
|----------------|-------------|----------------|--------------|
| 1891 . . . . . | \$4,705,672 | 1906 . . . . . | \$22,388,383 |
| 1896 . . . . . | 5,235,003   | 1911 . . . . . | 41,976,797   |
| 1901 . . . . . | 11,831,086  | 1916 . . . . . | 65,303,822   |

## Dividends.

Dividends and bonuses paid to the end of 1921 amounted to \$23,140,734 for gold mining companies, and \$84,388,185 for silver mining companies or a total of \$107,528,919.

## Mining Regulations.

A miner's license costs \$5.00 per annum, and entitles the holder to stake out in any or every mining division three claims of 40 acres each. After performing 200 days' assessment work on a claim, patent may be obtained from the Crown on payment of \$2.50 or \$3.00 per acre, depending on location in unsurveyed or surveyed territory.

## Assay Office.

The Provincial Assay Office at No. 5 Queen's Park, Toronto, is maintained by the Department of Mines for the free identification of minerals, free assays under the provisions of the Mining Act of Ontario, and also for general assay work as per the Schedule of Charges which may be obtained on application.

## Temiskaming Testing Laboratories

The Department maintains, at Cobalt, an ore sampling and testing laboratory which is now prepared to receive parcels of gold ore from 100 pounds upward, and after sampling and assaying the same to pay to the shipper the value thereof, less treatment charges. The purpose is to afford a market for ores extracted by prospectors and others in developing their mining claims, enabling them to obtain funds which they can use for further work and to report on the most satisfactory method of treatment. Fuller information may be obtained on application to the Manager, Temiskaming Testing Laboratories, Cobalt, Ontario.

## Publications.

For list of publications, illustrated reports, geological maps and mining laws, apply to

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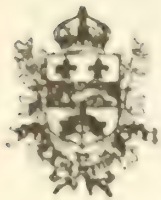
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**MINER'S CERTIFICATES.** First of all, obtain a miner's certificate, from the Department in Quebec or from the nearest agent. The price of this certificate is \$10 and is valid until the first of January following. This certificate gives the right to prospect on public lands and on private lands, on which the mineral rights belong to the Crown.

The holder of the certificate may stake mining claims to the extent of 200 acres.

**WORKING CONDITIONS.** During the first six months following the staking of the claim, work on it must be performed to the extent of at least twenty-five days of eight hours.

**SIX MONTHS AFTER STAKING.** At the expiration of six months from the date of the staking, the prospector, to retain his rights, must take out a mining license.

**MINING LICENSE.** The mining license may cover 40 to 200 acres in unsurveyed territory. The price of this license is Fifty Cents an acre per year, and a fee of \$10.00 on issue. It is valid for one year and is renewable on the same terms, on producing an affidavit that during the year work has been performed to the extent of at least twenty-five days' labour on each forty acres.

**MINING CONCESSION.** Notwithstanding the above, a mining concession may be acquired at any time at the rate of \$5 an acre for SUPERIOR METALS, and \$3 an acre for INFERIOR MINERALS.

The attention of prospectors is especially called to the territory in the North-Western part of the Province of Quebec north of the height of land, where important mineralized belts are known to exist.

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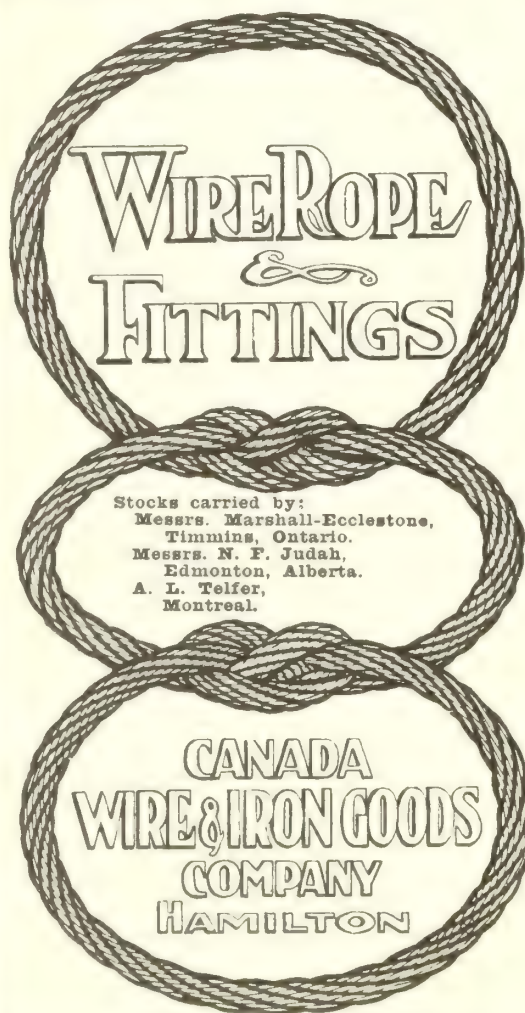
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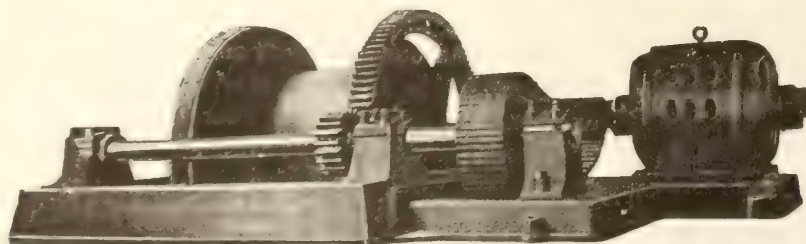
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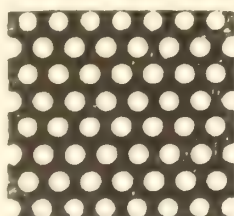
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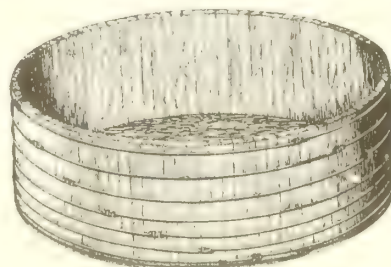
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No. 5

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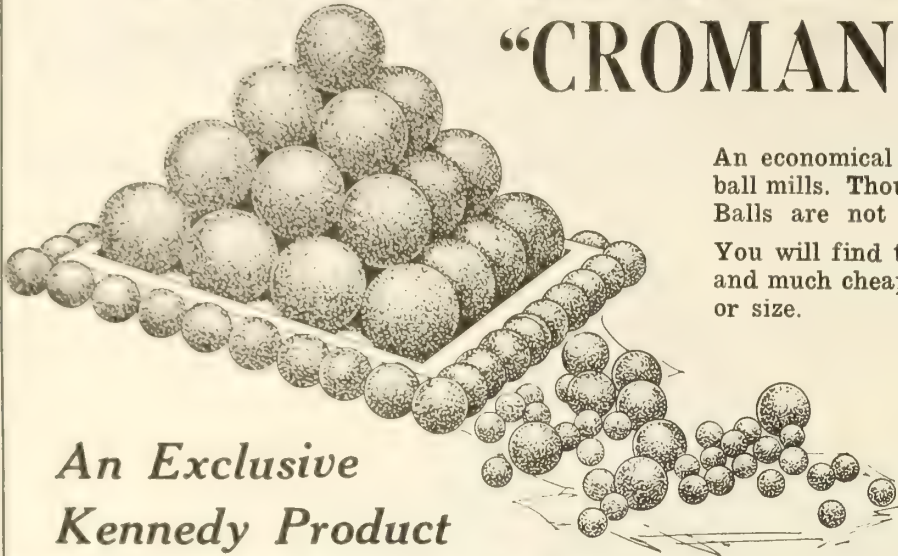
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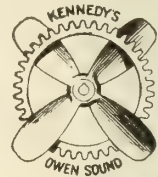
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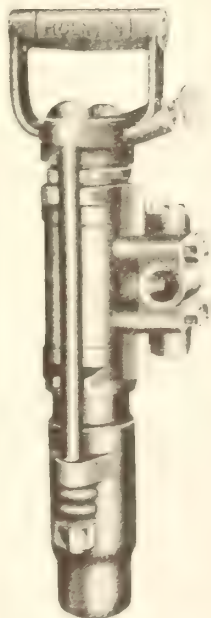
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## -:- EDITORIAL -:-

*Nature has endowed this Dominion with enough good, honest mineral wealth to give ample scope, and at least reasonably remunerative return to ..... many thousands of men, and plenty of opportunity for solid, if intelligent, investment of capital.—G. E. Drummond—1898.*

### WILL THE TRADES UNIONS SURVIVE?

Trades unionism is now on trial throughout the world. The modern movement for the organization of labour has grown with extraordinary rapidity since its inception, and now organized labour constitutes one of the greatest single social forces in western Europe and in North America. Its power is great and its potentialities even greater; it will stand or fall on the rational use or the abuse of that power.

Of recent years the power conferred upon organized labour by virtue of its unions has been characterised more by its abuse than by legitimate use. The ideals expressed by the best among its leaders and incorporated in the formal declarations of policy of the unions appear, however, to actuate very, very few of the leaders or of the private members. Selfishness, exclusiveness and an utter disregard for the rights of the rest of the world (who are, incidentally, in the majority) have appeared in so many shapes and guises as a result of trades union activities that the good work the unions have accomplished appears insignificant in comparison.

In Italy the state of affairs became insufferable last November. The trades unionists by their crazy demands and scarcely less rational conduct almost brought Italian industry to a standstill. The mercurial Italian temperament provided a solution for this impasse; a national hero, Mussolini, rose to the occasion and at the head of his bands of Fascisti rapidly put the trades unionists in their place, restored a stable government and set the wheels of industry revolving once more.

Events march with more deliberation in Anglo-Saxon communities. In spite of an overwhelmingly industrial population, Britain has never yet been dominated by labour's demagogues; the British working man is, at bottom, a shrewd fellow and round. The more moderate and thoughtful, as well as more honest, of labour leaders held important office and did yeoman service in the coalition government during the stress of war-time and the struggles afterwards to regain normal conditions. Still, the industrial depression of 1921-22 brought the occasion for a most decided "show-down" between organized labour in

Britain and the rest of the population, and the unions submitted to the inevitable with more grace than might have been expected of them. The British workmen is learning once more that he must work, and work hard, for a living, and there is no longer any need for the "middle class union" that was mooted.

Australia is at present in the depths of an industrial depression brought about almost exclusively by the refusal of her organized workers to do an honest day's work. With natural resources and favourable conditions that are enjoyed by few other parts of the world, the Australian is not now making a particularly good living, simply because he refuses to work for it. He is looking for something for nothing — and is getting nothing for nothing, thereby illustrating a truth that is axiomatic to all, but the misguided labour leader and his dupes.

On this continent the issue has not yet been so clear-cut as it was recently in Britain and more recently in Italy. We are still too prosperous to worry about a little thing like the basis of our industrial production. Anyhow, most of us still retain the habit of working, inherited from our pioneer ancestors, not far back. But sooner or later we must face the issue, and the issue will be between the forces of selfishness and the forces of decent, Christian-like co-operation; between the man whose vision is confined to himself, his union, or his class and the man whose vision includes the rest of his countrymen as well.

If our labour unions are to survive this test (and we sincerely hope they may do so) it will be by virtue of a broadening out of their policies so as to be less exclusive of the other parts of the modern civilized community. The locomotive driver must realize that the factory hand working for low wages virtually hands over to him each week part of what he has earned, in order to swell the fat railway envelope to its present inordinate dimensions; the locomotive driver is to just that extent a parasite and a burden on the community. The coal miner who works five hours a day and five days a week will have to depend for part of his livelihood upon the scrub-woman who buys his coal at an exorbitant price.

There are signs that the substantial labour leaders of Canada and the United States are reading the signs of the times and are making ready to return to the



true ideals of labour unionism. Only by such a move can these leaders preserve themselves and their unions from the nemesis that overtakes the confirmed self-seeker.

### THE MINING STOCK EXCHANGES AND THE MINING INDUSTRY

During recent months we have wondered, both publicly and privately, why Canadian mining shares have not been listed on the London mining stock exchanges. The principal reason, so far as we can determine up to the present, is that for investment purposes the operations of Canadian mining stock exchanges are a farce.

It is an axiom in mining investment that the rate of return must be such as to return the sum invested, with interest, within the life of the mine. This rate is conservatively estimated at 12 per cent. per annum, if applied to mines that are thoroughly proven and that give promise of a reasonably long life and steady production. If one included in the estimate near-mines and those of erratic disposition, the rate of return would have to be correspondingly higher.

Now, what do we find on Canadian exchanges? Consider Hollinger. It is selling today at about \$12.50 per \$5.00 share. The present dividend is 13 per cent. per annum. This gives a return of slightly over 5 per cent. to the investor who buys at this price—some-what less than half the rate it should return to be a good mining investment. True, the Hollinger is the nearest thing to an ordinary industrial concern—a gold factory—that one could hope to have; but that does not preserve it from the vicissitudes common to all mines, and does not warrant the prudent investor in allowing his hopes to outweigh his knowledge. Hollinger may demonstrate later that it is worth \$12.50 a share—we hope it will, and in fact are confident it will—but that hope and that confidence are a basis for speculation, not for investment. Hollinger is the nearest thing to an investment we have in the whole long list; we refrain from discussing any of the others.

Yes, speculation, not investment, is at the bottom of the operation of our Canadian mining exchanges. Whether the speculation is strictly honest or not, there can be two opinions; but that there is speculation, and speculation only, involved, there can be no doubt. The man who wants to “take a flyer” can get some pleasurable excitement out of the mining exchanges. The man who wants to invest his money keeps away from them, unless he grows wool on his back or is of the finny tribe.

London has available already plenty of devices for stock speculation, without borrowing any from Canada. It would add neither to the attractiveness of speculation in London nor to the reputation of mines in Canada were Canadian mining stock quotations, as extant in Canada today, listed on London exchanges. Transactions on the basis of these quotations have only

the remotest connection with actual mining operations and cannot aid the industry materially, whether they are in London, Montreal, Toronto or Victoria. What we need is capital for our growing mining industry, and we cannot see how mining stocks, grossly over-capitalized at the market price, can be an attraction to new capital.

Canadians, or at least some Canadians, are rapidly becoming aware of the fact that mining can be made a sound, paying business, much like any other line of business. There is as yet no hint of this realization on the Canadian mining stock exchanges, which at present do not appear to be a legitimate part of our mining industry. If they should become a legitimate part of the mining industry by conforming to its ideals of sound business methods, there is no doubt that they could aid the industry materially. Meantime, we can hardly recommend to our trans-Atlantic cousins that they join us in what is, in general, a doubtful speculation. We hope that, as time passes, our mining stock exchange transactions may develop at least an approach to the methods of sound investment. Only thus can they become genuinely identified with Canada's mining industry, as are the regular stock exchanges with the other phases of our industry.

### CANADIAN ARSENIC

The recent revival of the market for arsenic compounds gives point and pith to a bit of research work that has been conducted, quietly and consistently, by a little band of Canadian researchers during the past three or four years.

As is well known, the silver ore of Cobalt contains a notable proportion of arsenic, and at present constitutes the main source of arsenic in the Dominion. This is recovered as a by-product in the various plants that treat ore from Cobalt, and its annual production reached \$608,000 in 1917, principally as white arsenic. The bulk of this white arsenic was exported. By the way, there is still a standing offer, we believe, by the Ontario government of a bounty for the production of “white arsenic, otherwise known as arsenious oxide, produced from mispickled ores, and not from ores carrying smaltite, niccolite or cobaltite.”

White arsenic is virtually a raw material, the principal finished products being compounds and mixtures such as Paris green, acetate of lime, and so on. The production of these materials for consumption in Canada and their export in place of the raw material should be a decided advantage to Canadian industry.

The reduction works at Deloro produces the larger part of Canada's arsenic at present. The process in use there for separating and refining the various ingredients of Cobalt ore was devised by a professor of

metallurgy working in his laboratories in the School of Mining, Queen's University. By special co-operative arrangement with the university authorities, the research work of the Deloro Smelting and Refining Company has been conducted continuously since then in the laboratories of the university. This constitutes one of the rare instances in Canada where industrial research, under private auspices, has been conducted successfully over a term of years in co-operation with a university. The advantage is mutual, and the practice is capable of wider application.

The object of the Deloro Smelting and Refining Company is, of course, to make the most of their opportunities. One opportunity they have foreseen shrewdly lies in the manufacture of the various arsenic products from their crude arsenic. In spite of the depression in the arsenic trade since 1917, their researchers in Kingston and their operators at Deloro have laboured continuously at this task. They established accurately the scientific basis for the preparation of the various arsenic compounds (heretofore only imperfectly understood) and then proceeded to devise ways and means of applying these principles industrially. The results of these years of faithful, painstaking research should, and will, be to put the company in a position to reap the maximum of benefit from the present market for arsenic compounds.

If there are still remaining any Canadians who doubt the efficiency of scientific research, let them examine the record of the Deloro Smelting and Refining Company, which was founded on research, has been built up by research, and is still researching with an intensity that augurs well for its future.

#### EDITORIAL NOTES

Two weeks ago the *Journal* discussed in a general way the possibility of the occurrence of placer gold in Labrador, and referred to the present attempt to raise money publicly to work alleged placers there. Since then we have had private information that confirms our impression that the placer find is a barefaced hoax. This cannot be proved definitely, however, until an examination by some competent person is made of the reputed pay gravel. As this cannot be done until next spring after the snow and ice are gone, we must reserve final judgment until then. In the meantime, let the public beware!

During recent years a very large amount of research work has been done by the United States Bureau of Mines on practical problems. Lately much of this work has been done in co-operation with private institutions such as the Universities. One such piece of research work, on drill steel, has been conducted by Professor Charles Y. Clayton of the Missouri School

of Mines. It is described by him in a paper, "Hardness and Heat Treatment of Mining Drill Steel Shanks," to be presented at the New York meeting of the American Institute of Mining and Metallurgical Engineers this month. The data show a rather ridiculous diversity in present practices, and the results indicate practical rules for getting the best out of the various grades of drill steel. The investigation is still in progress, but this interim report is worth close attention.

We are pleased to have for publication today the full text of the resolution whereby the United Mine Workers headquarters executive repudiate any alliance with, or even sympathy with the Moscow "Reds." As the move was taken because of the well-known radical tendencies of the present accredited executive of the mine workers of Nova Scotia, the pronouncement is of special interest to Canadians. This may bring the following of the Sydney radicals to their senses.

The fact that a substantial number of industrial and financial leaders in the United States realize the true position of mining in the national economy is demonstrated by the widespread support given the recent Anaconda bond issue. The new corporation's assets are principally copper mines and plants for treating copper ore.

#### HISTORY — III

##### ASCENDANTS

When Earth was mostly vapour  
It was a dizzy spot;  
Small comets cut a caper,  
And everything was hot,  
As time induced a cooling  
Quite solid grew our sphere,  
The comets ceased their fooling,  
And cell-life started here.  
By aeon-long gradations  
The Scheme of Things resolved,  
And, by our calculations,  
Crude fishes were evolved.  
Through ages all unmeasured—  
Deny the truth who can—  
(O! Origin untreasured!)  
Fish-life progressed to man.  
Thus, though against our wishes,  
Resent it how we will,  
We all descend from fishes—  
And some are fishes still.  
This being demonstrated,  
Despite protesting damns,  
It scarcely need be stated—  
Geologists were clams!



# The Discovery of Porcupine

by TOM SAVILLE

Joe Moore, a Hudson's Bay Scotsman (half Indian but a whole man) was tanning a moose hide at his camp way down on the Matagama River. The bear hunt was just about over and he and his family were making ready to go into the H. B. C. Post at Fort Matagama with their winter's catch of furs. His women folk were busy outside, smoking moose meat for their trip in, and the children were playing down at the sandy beach where the canoes were pulled up. Joe noticed that there was something wrong with them for they were running up to the camp, scared like, and then soon he could hear them—"Shakanash! Shaka-nash!" (Ojibway for white-man), and sure enough there was a canoe coming round the Red Pine point.

Joe goes down to meet them and bids them welcome. "Come on ashore and stretch your legs,"—which they do.

"Are you Joe Moore?" asks the bowsman as he steps out of the canoe.

"Yes, sir, that's my name," answers Joe.

"Well my name is Parks, and I'm glad to run across you. The Factor up at Lake Matagama told me you could give me a lot of information about the routes through this part of the country. I'm employed by the Department of Mines, making a preliminary geological survey and I particularly wish to cross overland from the Matagama to Night Hawk Lake."

"Well, sir, there's a kind of a route across, but not very well travelled. I was through there last fall with my canoe as far as Kag-a-sa-ki-kun (Porcupine Lake) and put in an odd blaze. I have a bear trap set on the portage between them first two little lakes and I'll come with you now and pick it up. Then I'll make sure you don't miss that little creek where you turn off the river to go across. We'll have a little drink of tea first and then away we'll go."

So away they go, and Joe picks up his traps, and while the canoe man is cutting out a fallen tree Joe and the Doctor have a farewell smoke.

Joe is saying, "No, sir, I don't know much about rocks. About all I know is that they are hard on our birch-bark canoes in the rapids and hard on our moccasins on the portage. What kind of rock would you call this?" says Joe, poking with the back of his axe some loose rusty looking material.

"That's schist, Joe, and the way it is mineralized is indicative of carrying values in gold. Maybe you have a gold mine on your hunting ground, Joe!"

"I hope I haven't," answers Joe. "That would mean I'd have to look for another hunting ground. Well, I guess I'll be getting back to my camp now. You can't miss the route now. So good-bye, and good luck."

"Good-bye, Joe, and thanks," says the Doctor, and away goes Joe Moore to his hunting camp and the geologist to his rocks.

\* \* \*

A few years later, the scene is the same, but the atmosphere is different. Silver has been discovered and Cobalt is right in its glory. Prospectors are stampeding and spreading out in all directions. "Diabase" and "bloom" are discussed around every campfire. The

Montreal River is the happy hunting ground, and Gow Ganda is the Big Noise. About this time we found ourselves away up at Was-ac-sing (Shining Tree), a hundred miles from the jumping-off place at Latchford on the T. and N. O. Ry., anchored to a bunch of silver claims that looked right—but which we were beginning to see were put in wrong by poor transportation facilities. It was about Christmas time, my pardner and I had made a good fall hunt and were considering taking our furs into the post over at Fort Matagama.

"All right, Lisa, we'll go. I guess you'd like to see your father." (The chief of the Matagama's).

I had made a toboggan and bent some snowshoes, which she had laced with babish, and with our team of husky dogs we would travel right. We got our outfits made up that night ready to start at daybreak, and we figured we would only camp out one night. Away we went bright and early, the huskies glad to be on the trail after being tied up on purpose for some days previous so as to make them keen to travel.

We had no sooner got away from the camp than the sun came up, flushed and angry looking, and we knew we were in for some kind of dirty weather. It wasn't long getting down to business. It sure did snow. We did well to get as far as Wa-sa-pi-ka (White Rock) and there we camped for the night,—a fire the first thing,—and while I was using one of my snowshoes for a shovel, pulling the snow off a little side-hill and banking it around, half moon fashion facing into the woods, my pardner had unhitched the huskies, tied them out of the wind, unlaced the toboggan and had cut some poles and balsam brush. The poles I stood up round the fire, the brush in front of the fire and with the toboggan cover thrown over the poles and with a good fire high up in front of us and the heat throwing down and into our "nest", fat moose ribs a-sizzling, speared on sticks, the tea pail just about boiling, lots of wood cut to last all night, the huskies wrangling after being fed, and with clean change of wollen socks and moccasins and a good wash up in the snow, and with that tired but pleasurable feeling, we could truthfully say, "This is the life!"

In the morning I measured the snowfall with my axe-handle—14 inches on the level; but we weren't going to turn back after getting this far, but we knew that a heavy fall of snow such as this would soon raise the slush over the ice, and that would make slow travelling. Anyway we broke camp, laced everything up tight on the toboggan, hitched up the huskies and went to it, my pardner driving the dog team and me breaking trail—some exercise, I can assure you!

We came in sight of the Post two days after New Years. As soon as we got close my pardner suggests giving the dogs their wind, so we pull in behind a point and make a fire and my suspicions are confirmed. The wife dolls up—fancy, beaded buckskin moccasins, silk worked gauntlets, sash and all, and with some beaded buckskin work she trims the huskies up too, and we pull into the Post in style.

Everybody is out to welcome us. My pardner is soon away with the Factor's daughters, my huskies unhitched and fed and the Factor has conjured me into his den for a snort of Hudson's Bay Special. While I'm thinking



what a fine old world this is, after all, in comes the Stranger.

"Shake hands with another prospector, Tom," says the Factor.

We shake, and he tells me his name is Daigle—R. B. Daigle from the West; that he has met Joe Moore, who has showed him some rock samples and that he is planning on spending the following summer prospecting on Joe's hunting ground.

Well, we sure do enjoy ourselves at the Post for a few days. Everybody is happy and we are just like one big family. We dance the Bear, the Duck, the Fisher, the Rabbit,—everything but the war dance. We played out two fiddlers and wore out the drum. By this time the slush had frozen and the lakes were in good shape to travel. So after shaking hands all around, and a few dog fights, we hitch up what's left of ours and hit the trail for Shining Tree.

\* \* \*

Later in the same year after the freeze up, I am down in the Big Smoke and who should I run into but the "Stranger" I had met up at Fort Matagama.

"Hello, Tom, I'm looking for you. I heard you were in the city. Come on down and have lunch with me and I'll tell you about that Porcupine expedition."

He tells me that he went down there with a white man, Bob Mustard, and a Hudson's Bay Scotsman, Bill Moore. They packed in a big outfit, enough for the season, including blacksmith outfit. They camped on the first little lake from the river and stayed right there, stripped and trenched and sunk a pit about eight feet deep and took a lot of grab samples, and just got out to Biscotasing on the C. P. R. before the ice got them. Daigle had his assays made and the assay was four dollars and twenty cents.

"I don't think I'll record them, Tom,"—and he didn't.

"I'm going to make a trip up into Ungava," he told me, "and expect to be gone a couple of years, and I want you to put me in touch with a couple of good Hudson's Bay Scotsman." Which I did, and away they went to Ungava.

The mining world knows what happened while they were away,—Bannerman with his first discovery,—Hunter sees it on Porcupine Lake, but Jack Wilson makes the "Big Discovery" on the Dome. This starts the Stampede and brings in Benny Hollinger and the bunch, who stake, and Benny Draws the Big Prize—the Hollinger Mine.

## AN ENGLISH VIEW OF CANADA'S GOLD FIELDS

*The following, which has appeared editorially in The Mining Journal, London, illustrates well the present English view of gold mining in Canada.*

At the opening of the New Year the question which most of our readers are asking themselves—When is mining going to revive?—naturally presents itself with special emphasis. In the past public interest in metaliferous mining has to a predominant extent centred on the production of gold. Now gold, while it has at times such as those which we have recently passed through some commodity value, is dependent for its quantity of production mainly upon discoveries of new fields or extensions of old ones. We are once more

approaching the time when gold may be expected to have a fixed value—fixed, that is, in relation to currencies, for in relation to commodities the purchasing power even of gold must be an ever-fluctuating one. The importance of a fixed value is that there is no fear of over-production, and consequently no interference with the free market.

The production of gold was on the decline before the war, because of the failure of the prospector and miner to reveal fresh fields to replace those being worked out. The decline was extraordinarily intensified during the war, and those who regard an extensive gold supply as at all indispensable for the smooth course of international business in future years are conscious of considerable uneasiness at the steadily narrowing volume of supply. In the Western States of America interest in gold mining among capitalists continues to decline; Australia has fallen very heavily, and will continue to do so; the Rand decline has perhaps been stayed, but the future is too dependent on conditionals to permit of a positive asseveration here; India looks like some recovery, but the potentialities of increase are not such as to influence the general situation of supply. Mexico may show us substantial developments in years to come, but gold mining is of secondary importance among the mineral products of the country, and if more settled conditions permit of a rapid development of Mexico's mineral riches we shall probably see other minerals reflect this movement to a greater extent than gold. Russia will probably show some betterment, but in common with other industries of the country the near future is much too uncertain to permit of any estimate being made.

There remains, therefore, only one producer which certainly promises us substantial development in the production of gold — viz., Canada. The impression perhaps prevails that Canada last year showed less progress than was hoped to be the case during the spring and early summer when some promoting activity was apparent in London. We do not think, however, that this impression is justified. The Ontario statistics for the first nine months of 1922 show an output for the Province of 750,000 fine ozs., and allowing for the steady expansion that is going on the year's total may well reach 1,100,000 fine ozs. As the Government report points out, the increased crushing capacity of the Hollinger mine is shortly to be available, enlarging the capacity to 7,000 tons per day, an increase in the milling capacity equal to the present output. How far this increased rate of crushing may be attended by the treatment of lower-grade ore we do not know, but allowing for the advent of fresh producers during the year it seems not beyond the bounds of possibility that Ontario in 1923 may produce as much gold as Western Australia did in its best days. In any case, whether this result be realised in the current year or no, there seems every reason to expect that the Province of Ontario will, ere long, be producing at a greater rate than Western Australia ever did.

Under these circumstances it is certainly remarkable that gold mining prospects in Canada have not attracted general attention in this country. Conditions, of course, are not what they were before the war, and New York is much nearer than London; but when due allowance is made for these conditions, we cannot help the conclusion that there is far less enterprise existing at the present time among those connected with mining than was the case at the beginning of the century. The chief reason is no doubt the disappearance of the nu-



merous smaller interests and the domination of the position by a few big groups more or less inter-allied. Probably the policy of such big concerns is to refuse prospects out of which small syndicates in the past might have done well, and take up only those which are capable of early flotation at high capitalisations, so as to secure a large and rapid profit on the turnover. In the end a policy of this kind, while profitable perhaps to the individual group, must be very restrictive of local enterprise in gold mining.

We gather that at length somewhat more attention is being paid to Canada by the big gold mine promoting interests here, but considering that Ontario is British territory not more than a week distant from London, the evidences of a realisation of the potentialities of the situation are most disappointing. Not only is the production itself impressive, but the physical features are noteworthy. The area of the newer gold discoveries in Canada is very extensive, and though Northern Ontario is by far the most important, other Provinces also have their discoveries of promise. Then, again, and even more important, gold is met with under quite new geological conditions. In earlier days Porcupine, like Kalgoolie and the Rand, was depreciated because the geological conditions were not familiar. The lenticular character of the deposits was pointed to as evidence of patchiness. Now, however, practical experience is leading to the belief that the lenses have a definite relation to one another: those who have worked most extensively on the field believe that an indicator system can be detected. It is also claimed that at Porcupine, at any rate, the values have improved with depth, and that the payable width of the lenses is often extraordinary. As the gold occurs, not in defined veins, but disseminated into the country, it is impossible to determine stopping widths except by actual sampling, and this, together with the necessity of seeking fresh ore bodies laterally, has made diamond drill boring a remarkable feature of the plan of development.

The Provincial Government has afforded every assistance for the installation of electrical power plant, and, consequently, diamond drilling can be carried out with a speed and cheapness unprecedented in the history of earlier gold fields. This is a factor which enables mines to show a development rate to which we are unaccustomed.

Ontario depends for her yield at this year to the extent of nearly 90 per cent. on the three Porcupine mines—Dome, Hollinger, and McIntyre—but the most encouraging feature of the situation is the large number of new areas of promise. In an article elsewhere in this issue Mr. Gwyn-Williams, who spent last summer and fall in investigating many of the new camps, discusses the showing and leading geological features of a number of the districts. His paper is probably the most comprehensive record of individual observations which has yet been published, and should go far to convince capitalists that there is a very extensive field inviting attention.

English engineers encounter in Canada many conditions to which they are unaccustomed, and which they are apt to think are better managed under the mining laws of other States. But no mining law will give satisfaction to all comers, and if the country continues to make the rapid development which those who have observed it most closely expect, conditions of tenure and promotion will soon be overlooked. The mining community in Canada is a vigorous one, with imagination and constructive ability, and the Provincial Governments generally are hardly likely to make the mistake, which

has so fatally reacted upon Australia, of subordinating the interests of capital to the political exigencies inseparable from a dependence upon a Socialistic Labour Party.

## LETTERS FROM READERS

### *A Sermon to the Editor*

To the Editor,

Can. Mining Journal

Sir:-

In your issue of November 17th, under the heading "Letters from Porcupine — Inside Stuff" there appeared the following:-

"While examining a lot of rich specimen ore displayed on the dump of a Porcupine mine, a super-ethical Canadian Professor was observed surreptitiously jamming a few of the choicest pieces into his side pocket. Technically that professor is quite as liable to arrest as were recently extradited children of sunny Italy."

To those who were in Porcupine last autumn (and to others also perhaps) this obviously refers to myself. The only dump on which rich specimen ore was displayed was the Paymaster, the only professor there at the time was myself. A photograph of the dump with myself in the group was widely published.

In your issue of Jan. 12th., in an Editorial Note you state that "the implication in this case is quite without foundation." This releases you as far as I am concerned but you still leave an implication against "all professors" and treat the whole matter in anything but a serious manner.

You are a Queen's man, a son of a professor, a son of a Dean of Professors, but I believe I know Queen's professors better than you do. I know intimately any who are likely to visit Porcupine, and I cannot conceive of one of them surreptitiously pocketing high grade or choice specimens of any kind. We have most ardent professors of mineralogy and of geology in Toronto and I have accused them of sundry and various lapses, but they would not do that. Why should they? They are treated at all the mines with the most open-handed hospitality. The managers and the members of their organizations give freely of their time and of their information and equally freely of all specimens that could be of use to the students. To turn round and pocket surreptitiously would be a gross return. This is not super-ethics, it is very ordinary, common decency. To do otherwise would be very dirty.

You and your *Journal* are trying for a high and honourable place in mining affairs in Canada. You have made a good start and we have told you before that we appreciate it. But in this case you allowed your correspondent of "Inside Stuff" to make a statement that was absolutely untrue. He accused a professor and engineer not only of a most unprofessional thing but of a dirty thing. A letter or telegram of inquiry would readily have given you the truth. Your own evidence in the matter shows that its object was to irritate.

Now this is not typical of yourself, Mr. Editor. I cannot conceive of you surreptitiously pocketing high grade. Also I am glad to say that such "inside stuff" is not typical of the *Canadian Mining Journal*.

Don't let it occur again.

H. E. T. Haultain

Duluth, Minn.



# Investigation of a British Market for Canadian Non-Metallic Minerals\*

By HUGH S. SPENCE, M. E.

The following notes on factors governing the market in Great Britain for certain non-metallic minerals produced in Canada comprise information gathered in September 1922 in the course of a survey of the British trade, as represented by some of the more important consumers, brokers and importers of such materials. It should be understood that the general condition of trade as mentioned in the introductory paragraph is that obtaining during the last quarter of 1922; this condition, it is to be hoped, will gradually change for the better.

## Introductory

The moment at which the above survey was made proved to be an unfortunate one for attempting to arouse interest with the British trade in Canadian minerals, owing to the general industrial depression and the political uncertainty. Trade in general in Great Britain is in a very depressed condition, and recovery from the post-war slump in many industries has been slow and hampered by the coal and engineering strikes. The present unstable exchange, also, is having a very prejudicial effect upon industrial activity. In addition to the fluctuating exchange curtailing buying of raw materials by rendering manufacturers disinclined to lay in stocks, the more favourable exchange with many European countries having resources of the minerals required naturally makes it to the British importer's advantage to buy from such countries, rather than from Canada. The depreciation of the franc, for instance, makes it to the British importer's interest to obtain his graphite from Madagascar, a French possession, and the same holds good of mica, of which mineral Madagascar has recently been shown to possess important deposits. The relatively low production costs in countries supplied with black labour, such as the various French and British colonial possessions, still further works to the disadvantage of Canada in competing for the British market.

The result of the enquiries instituted goes to show that Great Britain at the present time is not buying at all heavily of non-metallic minerals; that manufacturers in some cases are carrying considerable stocks both of minerals and of manufactured goods; and that mineral brokers, in consequence, are not greatly interested in Canada as an immediate source of non-metallic minerals. The Atlantic freight, also, (at present about \$6 per ton from Eastern ports), plus the rail charges from point of production to the Atlantic seaboard, constitute a serious obstacle to trade relations. In the case of feldspar, for example, these combined freight costs practically equal the c.i.f. selling price of feldspar in Great Britain today.

In order to assist Canadian producers who may be desirous of seeking an outlet for their mine products in Great Britain when general trade conditions shall improve, the Mines Branch has compiled lists of the more important British consumers, dealers and brokers in many of the more important minerals — particularly the non-metallics. Copies of these lists may be secured on application to the Director, Mines Branch, Department of Mines, Ottawa.

**Barytes.**—British barytes producers are already feeling the effect of German competition, the German barytes being a better crude and also more carefully ground and prepared for the trade than the English. It is regarded as certain that, when conditions permit of a greater certainty of delivery from Germany, German barytes will supplant domestic or any other barytes in the English market. In September 1922, German barytes, prime white, water floated, 99 per cent.  $\text{BaSO}_4$ , was quoted at \$18 per ton c.i.f. United Kingdom.

The principal use of barytes in England is in the paint trade.

**Bentonite.**—Bentonite is a colloidal clay found in certain parts of Western Canada, and in Wyoming and Dakota in the United States. Its extremely fine state of sub-division, and its peculiar property of swelling to several times its mass and forming a mineral jelly upon the addition of water, indicate that it may prove to be considerable importance in industry. Suggested uses for the material are in the loading of paper, textiles and other fabrics, in rubber, paints, sizing of yarns, and the dye industry. Successful commercial use has already been made of bentonite in the United States for de-inking old newsprint and to increase the retention of china clay in the manufacture of paper. It has also been employed in a small way in coloured crayons, and as a component of adhesive pastes.

In 1921, the Mines Branch negotiated the shipment to the Imperial authorities in London of five tons of Alberta bentonite, to be distributed to various industries for experimental purposes. A survey was made of these industries in order to ascertain what progress, if any, had been made in the research work on the material. It was found that practically all attempts to develop a use for the bentonite had failed, and little interest was expressed in its possibilities. This is due, in part, to the expense of freeing the crude clay of the percentage of relatively coarse grit usually present. If ordinary settling in water is practised, the gelatinous nature of the water-saturated clay renders drying of the cleaned product difficult and costly. This obstacle will doubtless be overcome eventually — possibly by employing some medium other than water for washing the clay. The progress already made with bentonite in the United States gives ground for believing that further research will result in the successful utilization of the material in various lines of industry.

**Corundum.**—Brokers report that considerable quantities of corundum are now coming on the market from Madagascar and Rhodesia; these importations supplement the main supply, which is derived from India. The Madagascar corundum is in the form of loose crystals of various sizes, and is probably won from soft, weathered rock, thus dispensing with expensive mining and crushing. The Rhodesian corundum is stated to be surface float, and is rather different in character to the Madagascar. Rhodesian corundum is quoted at \$45 to \$54 per long ton c.i.f. United Kingdom, and Madagascar crystals at \$45 per long ton.

**Diatomaceous Earth.**—Dealings in this material are largely confined to one firm, the Kieselguhr Supply Company, 1 Great Winchester Street, London E. C. 2, who draw their supplies from many sources.

\* Memorandum Series, No. 6. — Mines Branch, Ottawa



A large percentage of the diatomaceous earth used in Great Britain goes into insulating bricks and pipe-covers. A quantity is also employed for filtering purposes in the sugar industry, in the refining of oils, fats and glycerine and as a filler in rubber. The annual consumption of diatomaceous earth (or kieselguhr, as it is commonly termed in the trade) for all purposes in the United Kingdom, is given as 6,000 long tons, and that of the world as 36,000 tons.

For insulating purposes, an earth of low specific gravity is demanded, colour being immaterial within limits. German kieselguhr which is considered the best on the market, averages 13-14 pounds per cubic foot. The rubber trade stipulates for a white, iron-free earth.

The price of diatomaceous earth is dependent largely on the structure and shape of the diatoms, since these characters control the specific gravity and the consequent absorptive and insulating power. Diatoms vary widely in the above respects, hundreds of forms being known; and a knowledge of diatom structure is therefore requisite to enable the value of an earth to be gauged with the help of the microscope.

German kieselguhr undergoes a washing process to remove grit, and is water-floated to ensure a uniform product. Air-dried earth is considered superior to ki-dried. Far closer attention would appear to be paid in Europe to the cleaning and grading of diatomaceous earth than has been the case among Canadian producers.

**Feldspar.**—A special effort was made to ascertain the factors governing the feldspar situation, since Canadian producers of crude feldspar have been endeavouring for some years past to enter the British market. This market has been supplied for years past virtually entirely from Scandinavian sources. Little authoritative information has been available regarding the possibilities of the British market for feldspar and Canadian producers have, therefore, been working rather in the dark when making an effort to establish trade connections with Great Britain.

A temporary shortage of feldspar was experienced in Great Britain toward the close of 1920, and during the early months of 1921 high prices ruled for both crude and ground spar. This situation being brought to the attention of Canadian producers, serious efforts were made to negotiate sales of Canadian feldspar to the British trade. These efforts, however, proved practically fruitless, since the shortage was of brief duration, and prices soon fell to a much lower level.

It was with a view to securing authoritative information on the present market possibilities that a visit was made to the Potteries district, in order to interview the chief pottery firms and potters' supplies houses. Dealings in feldspar in Great Britain are mostly conducted through potter's supplies firms, though limited sales are also effected through general mineral brokers, a number of whom were also interviewed and their views secured. The result of this investigation may be summarized briefly as follows:

The market for feldspar in England is not large, the annual consumption by all trades, including the metal-ware-enamelling industry, probably not exceeding five thousand tons. This is considered to be an outside figure, and the actual consumption in the last two years is thought to be considerably under this amount. Cornwall stone practically takes the place of feldspar in the

English pottery trade, and for various reasons is preferred by English potters. Being of domestic origin and available in large quantities, it is, of course, much cheaper than feldspar. The feldspar used by the English pottery trade goes chiefly into brick glazes and vitreous floor tile bodies, very little being employed in white ware bodies. In this respect, English practice is the reverse of American practice.

The British market for feldspar is supplied practically entirely by Scandinavian, though there is a small production of domestic spar, some of which may also find its way to the pottery trade. The Scandinavian deposits are situated close to tide-water and can be worked cheaply. Small vessels that carry coals to Scandinavian ports load up with feldspar at the mines along the fjords and carry it to Runcorn (the head of Mersey navigation) where they discharge into barges. These bring the spar by canal to the Potteries and in this way, freight charges are reduced to a very low figure. The quality of No. 1 Canadian and No. 1 Scandinavian feldspar is about equal, and provided that Canadian spar could be laid down in England as cheaply as the Scandinavian, the trade would no doubt be willing to use it.

To meet Scandinavian competition at the present time, Canadian feldspar would have to be laid down at Runcorn at probably about \$13 per long ton. Since the Atlantic freight is now in the neighbourhood of \$6, this means that the spar would have to be put aboard Montreal or other port for \$7 per long ton, a figure which can hardly be approached by any of the inland producers.

The feldspar deposits of Norway and Sweden are regarded as capable of supplying virtually the entire European market, both immediate and prospective. Cheap water power, also enables the spar to be ground economically at point of origin, and considerable quantities of Swedish-ground feldspar are imported into Great Britain. While expressing themselves as completely satisfied with the quality of Canadian spar, most of the firms interviewed were of opinion that its cost laid down at the Potteries could hardly permit of any competition with Scandinavian spar.

Owing to the relatively small consumption of feldspar in England, users buy in small lots only, and there is consequently little chance for ship-load consignments (2,000-3,000 tons lots) being contracted for by the potters' supplies firms. The small vessels bringing spar from Scandinavia can proceed as far as Runcorn, which is a canal-head, and discharge direct into barges. Large ocean steamers, on the other hand, cannot do this but must discharge at a Mersey port, whence the spar would have to be shipped by rail to the Potteries or else railed to Runcorn, and there placed in barges, both measures entailing a considerable expense over the entirely water-borne Scandinavian spar. The potters' supplies houses, which grind for the trade, contract for delivery according to demand and do not carry the large stock that the American grinders do, with their much larger market. Since there are a number of such firms, each one grinds annually a relatively small amount of spar, possibly only a few hundred tons.

One prominent firm's books showed pre-war (1911) c.i.f. Runcorn deliveries of best crude Scandinavian spar at 20 to 25 shillings per long ton, equivalent, at pre-war exchange, to \$4.35 to \$5.44 per short ton. While it may well be that these low levels will hardly be reached again, present quotations are very much below the prices obtaining during the shortage in 1920.

**\*\*** This information regarding feldspar has been published already in the Financial Post, Toronto, and has given rise to some discussion.



It may, perhaps, be added that during the past two years, a number of mineral brokers not connected directly with the feldspar trade, as well as officials of the Imperial Mineral Resources Bureau and of the Canadian Trade Commission, have been actively looking into the feldspar situation, and that the results of the investigations, as communicated to the Mines Branch, correspond closely with those of the writer's own survey.

The question has been raised whether perhaps ground feldspar cannot be shipped profitably to Great Britain. This point has been considered and was taken up with the trade. In view, however, of the great importance attached by the pottery firms to the assurance of quality in feldspar, and the satisfaction hitherto afforded by the present source of supply, it may well be doubted whether the question of importing ground Canadian spar would be entertained at all favourably. A shipment of off-grade feldspar may cost a potter a great deal of money in spoiled goods, and he naturally prefers to be dependent on a local source of supply, from which he can obtain prompt redress in case of complaint. The potters and potters' supplies houses have been associated so long in the feldspar business that it would undoubtedly be a difficult matter to attempt competition.

**Garnet.**—The garnet coming on the British market is chiefly crude lump, which is preferred by the users to sized, ground garnet. This is due, probably, to the fact that the quality of a consignment is more readily apparent from an inspection of lump than of pulverized garnet; that garnet concentrates made from a garnet schist usually contain a percentage of other heavy minerals; and that the manufacturer can grind lump to his varying requirements without being obliged to stock up with a large range of sizes. Hitherto, Canadian garnet has been offered only in sized grades, representing the concentrates made by milling garnet schist. Such concentrates have been offered to the British trade at a c.i.f. price of approximately \$100 per short ton. As against this, crude lump garnet is selling at \$25-\$30 per long ton c.i.f. United Kingdom, with demand light and apparently no dearth of supply. There appears little hope therefore, that Canadian milled garnet can find a market in the United Kingdom at the price demanded.

It may be noted that the suitability of garnet for the abrasive trade depends very largely on the hardness of the mineral and on how it breaks—whether the fragments possess sharp, chisel edges or are of irregular form and exert little cutting power. All garnet is by no means alike in the above respects, and steps should always be taken to ascertain the quality of the material yielded by any newly-discovered deposit before its development is undertaken. Some garnets break down readily on light crushing into very small fragments, practically powder, and it is not practicable, therefore, to make from such material the full range of sizes required by the trade.

**Graphite.**—The British market for graphite previous to 1910 was supplied mainly from Ceylon, which island furnished a very superior grade of plumbago, or crystalline graphite, that was considered essential for crucible purposes. During the past decade, however, increasing quantities of flake graphite have been secured from Madagascar, a French possession, and this grade of graphite has now largely supplanted the Ceylon in the English crucible trade. In fact, one of the most prominent English crucible firms is understood to have

considerable capital invested in the Madagascar field, and to be using Madagascar flake almost entirely. If the latter statement be correct, it effectually disposes of the contention of American crucible makers that a good crucible cannot be made without Ceylon plumbago.

The graphite market in all countries has been in such a depressed state during 1921 and 1922, owing to the immense over-production in all the producing countries during the last year of the war and the accumulation of large stocks, that it is difficult at the present time to gain a correct index of the situation. The English crucible trade, which probably accounts for the great bulk of the graphite imported, is reported as stocked up with both crucibles and graphite, consequently present sales are almost negligible, and prices low. Best Madagascar flake is now offered at about 3 cents per pound, with few takers.

The general opinion is that Madagascar will continue to dominate the graphite market for years to come, and will ultimately supply the world's requirements for crucible graphite. Less and less Ceylon graphite is being used, as Madagascar flake can be supplied much more cheaply and has been found to answer crucible requirements.

None of the firms questioned could offer any immediate encouragement for Canadian graphite in the European market, either for crucible, lubricant or other purposes. The consumption of graphite in Great Britain for purpose other than crucibles and stove polish would appear to be very limited, graphite lubricants and foundry facings being reported as relatively little used. Madagascar graphite can, of course, be employed for these purposes perfectly satisfactorily.

**Mica.**—An important development that may ultimately result in affecting the Canadian mica-mining industry is the discovery within the last two years of important amber mica deposits in Madagascar. The deposits (about which little authentic information seems to be available) are said to be very large. Considerable quantities of Madagascar phlogopite have been coming on the English market, the mica being of very superior quality and the sheets of large size. Little in the way of smaller grades has reached the market, shipments consisting uniformly of knife-trimmed sheets measuring 2 x 4 inches and up. Madagascar mica is hardly distinguishable from the best Canadian phlogopite.

The low cost of mining in Madagascar, due to native labour and to the fact that the rock is stated to be weathered to a considerable depth should enable even narrow veins to be worked profitably, and may result in Madagascar proving a serious competitor in the mica market, more particularly for the larger and higher-priced grades. So far, there has apparently been little attempt to export the smaller sizes or splittings, Canadian sales for these grades being reported as good during the last quarter of 1922.

Discoveries of excellent mica, both muscovite and phlogopite, have been made in recent years in many parts of the world, including Rhodesia, East Africa, Mexico, Brazil and Cochin India, and considerable quantities of well-graded mica from these sources have been coming on the English market.

With respect to ground mica, it appears that ground amber mica does not find a ready sale in England, the principal user of ground mica being the wall paper trade, which demands a very high grade, silvery-white product. This is obtained from an American source,



and is prepared by a somewhat elaborate process, involving wet-grinding. The product commands a high price and is sold at \$1.00 per long ton c.i.f. United Kingdom. Some of the English wall-paper firms are supposed to have installed their own grinding plants to grind muscovite scrap obtained from domestic sources. The resultant product is not as good as the American, and goes into the cheaper grades of paper. One of the principal markets for ground mica on this side of the Atlantic is the prepared roofing trade, but relatively little of this material is made or used in Europe.

**Talc.**—Relatively little talc is used by the paper trade in Great Britain, its place being taken almost entirely by china clay, which is obtained from Cornwall and is much cheaper than talc. The talcum powder trade is a very limited one, relatively little being made or used. The paint trade also uses very little talc.

Most of the talc imported into Great Britain is of French, Italian or Indian origin, the raw material being essentially steatite, and grinding to a powder possessing good colour and high slip. Some Norwegian talc, also, is used. The Indian steatite is imported in block form, and is used for lava purposes—gas burners and the like. Lava is also prepared from high grade powdered talc, which is pressed into block form (so-called 'synthetic lava'). Some very good powdered talc of Spanish origin has also lately appeared on the English market. Canadian talc, from the Madoc district, has been imported in small amounts.

The total consumption of talc in Great Britain is small. Little or no block or slab soapstone would appear to be used. Samples of the grade of talc required by the English market would indicate that the Madoc talc is inferior in slip, and that from the Eastern Townships in colour, to the Italian and French talcs now imported. Brokers state that the supply of talc from Italy, France and Norway is more than adequate to satisfy British trade requirements. Norwegian talc, suitable for the rubber and paint trades, sells at \$27 per long ton c.i.f. United Kingdom, while the best Italian talc fetches as high as \$63 per ton.

### BALL BEARINGS IN MINES

In a paper recently read before the North of England Institute of Mining and Mechanical Engineers, the striking economies resulting from the use of ball bearings are discussed.

From figures compiled at a South Wales colliery a comparison between ball and roller bearings is instituted. The cost of maintenance and repairs for 2000 pit tubs fitted with roller bearings was £7,590 per annum. These tubs were fitted with ball bearings at a cost of £18,000. Allowing an interest charge of 6% on this amount, and including a depreciation charge of 12½%, the total annual maintenance charge was reduced to £2,430.

One great advantage was that one man could handle two or three tubs equipped with ball bearings, whereas he could handle only one roller-bearing tub. The change also dispensed with the use of power on mild down gradients.

Marked savings of power, smoother working, economy of time, and enhanced general efficiency resulted from the introduction of ball bearings.

About 175,000 natives are employed at the Rand, South Africa, gold mines at present, and about 1,200 at the diamond mines.

### PERSONAL AND GENERAL

ROGER A. BURRALL, formerly sales agent for Chalmers and Williams of Chicago, has accepted a like position with John Inglis and Co., Ltd., of Toronto, who have taken over the manufacture in Canada of the Chalmers and Williams reduction machinery.

WARREN H. S. MACFARLAND has been appointed manager of the various companies in the Yukon controlled by the Gold Fields Company of South Africa through its subsidiary, the Gold Fields American Company, of New York. The Yukon companies are the Burrall and Baird Dredging Company, the New Northwest Corporation, and some allied dredging and subsidiary companies operating in the Klondyke region.

J. M. TURNBULL, of the University of British Columbia, addressed the Vancouver Prospectors' Association recently on the subject of their chosen work. This is part of a systematic effort in British Columbia to aid the prospectors by means of competent instruction.

THOMAS J. MACDONALD, formerly manager of No. 10 colliery, Reserve, Nova Scotia, has been appointed manager of No. 24 colliery, Glace Bay.

NEIL A. MACDONALD has been appointed manager of No. 10 colliery, Reserve, Cape Breton. He has been formerly in charge of other collieries of the district, and leaves No. 9 for his new position.

J. MACKINTOSH BELL has sailed for England on business connected with the Keeley Mine, South Lorrain, Ontario.

J. G. SULLIVAN, the retiring president of the Engineering Institute of Canada, gave a very vigorous address on labour conditions to the Institute at its annual meeting in Montreal last week. He pointed to the fact that professional labour leaders are a menace to the peace of the community, and that the Industrial Council plan is a much more satisfactory means of collective bargaining.

H. C. BARLOW has rejoined the metallurgical staff of the Deloro Smelting and Refining Co., Deloro, Ontario. He has recently been on the staff of the Mining, Chemical and Metallurgical branch of the Dominion Bureau of Statistics.

The shipment of Nova Scotia coal by boat, principally to ports in the United States, continues to be brisk. The harbour of Louisburg is now in use, and it is hoped to ship about a cargo a day throughout the remainder of the winter.

The 127th meeting of the American Institute of Mining and Metallurgical Engineers is to be held in New York on February 19th-22nd. Members of the Canadian Institute have received a cordial invitation to attend the sessions, which include a comprehensive symposium on petroleum and gas, several sessions on iron and steel and non-ferrous metals, and sessions on ground movement and subsidence, breakage and heat treatment of drill steel, industrial relations, metallurgy and general mining topics.

The use of liquid oxygen, absorbed in charcoal, as an explosive in mining is creating a decided interest in mining circles. It is safe, both to manufacture and to use, and experiment has demonstrated that its power is about the equivalent of blasting gelatin. Results from its commercial use in Germany and in Mexico appear to demonstrate that it is more economical than the ordinary explosives.



# News and Comments

BY ALEXANDER GRAY

## *Alienated Affections, or What?*

Two of the strongest groups of oversea capitalists have joined American confrères and are about to restore the Comstock country to at least some of its pristine glory.

Hallowed be the name of Comstock!

Certain sections of Canada are sensitive about this new move, and will not concede that this adolescent Dominion is either unprepossessing, unreasonable or immodest.

It would not have been so disconsolatory, though, if the Consolidated Gold Fields of South Africa through its American subsidiary and the National Mining Corporation, both London institutions of wealth and influence, had bigamously wed a romantic relic within the age limit. Both are vigorous, with lusty progeny seated over the spheres. They are allied, of course, with the New Comstock Merger, capitalized at \$20,000,000, and while the family connection is venerable and Comstock is a name to conjure with there are those who think the strain could have been improved by a match hereabouts. However, the chances are that the antenuptial terms must be attractive and the only thing to do is to wish the international alliance the gayest sort of a joy ride.

None the less is it noticeable that there is a dissentient fraction in Canada who would have protested the bans. To see so much money and influence, hereditary charms and virility, linked in what they regard as rather unholy bonds, is rather trying to the pride and the patriotic emotions of Canadians, who really could do with a portion of what the London corporations have derived from their many notable and diversified industrial ventures. So, it is within the proprieties (though rather late) to convey regrets that the "Gold Fields" and "National" gave Canada the mitten. There had been advances through Mr. Frecheville and Mr. Tyrrell, which never reached the concrete proposal stage, not even when a flank movement was attempted incognito to elope with the Hollinger.

Somehow, and as a rule, London groups of great money-getting capacity either served the frappé or would not play with what they regarded as a "cold deck". What London took in the past twenty years, almost without exception, in the way of Canadian mining properties, was something a sea voyage could not invigorate; this, notwithstanding resident representatives with watching commissions, or New York connections.

Supposedly, the corporation created by Cecil Rhodes and so ably presided over by that Prince of Sportsmen, Lord Harris, and the more recent but hardly less consequential National Mining Corporation, directed by Messrs. Guedella and Agnew, and among others, our own Sir "Mike" Edgar, Bart., pursued their policy of preferring another Anglo-American undertaking, of which there are a number.

This is rather akin to the Mustard Gas, as affecting Canada. We have a miscellaneous array of magnates now, including Sir Binden Blood, a Knight of Pinner's Hall, Col. Grant Morden, and have exchanged the Bir-

go, Davidson, Aladdin, Herrick (in part) with others too numerous to mention in polite company. As another insufficient offset to the London participation with Canada that is sought, it is to be noted that the Guggenheims, United Fruit magnates and various American organizations, are cosily and profitably devoting themselves to British Columbia and Northern Ontario areas.

This American support minimizes whatever unjustifiable heartburnings there are, over the neglect of our mineral areas, even though it does not palliate the frigidity displayed by London and South African capitalists. It is unsatisfactory and undesirable to have the World Metropolis askant as to the real opportunities in Canada or predisposed toward "market deals" with "jobbers" in the leading roles. What share-holdings in prosperous Canadian mining enterprises London may now retain, is more in the nature of a compliment than it is a demonstration of confidence.

Doubtless the Gold Fields and National Mining Corporations, with their organizations, might have taken Canada more kindly and more seriously, were it not for an incompatibility of terms, vendors not infrequently declining to recognize the right of discriminating capital to decide the main features of these terms. On the other hand, London romped with most of the claims Hollinger now includes, did something worse with Kirkland Lake, retained its Lake Shores, wriggled out of Rea, induced the Imperial Government to guarantee the premier securities of a nickel company that is not functioning, declined the McIntyre, scrapped the Northern Ontario Exploration and Porcupine Development Companies — and now has Northern Tisdale and Matachewan!

Where the blame rests for the inability of Canada and London to get together, is for the parties of the first and second parts to explain. It is notable that Dr. J. M. MacLaren of the National Mining Technical Committee was one of the very first to accurately diagnose Porcupine. Messrs. Meyersbach and Marriott of Central Mining and Investment, the "Corner House", intimated that one of the groups of claims now incorporated in Hollinger Consolidated might be acceptable. Hollinger owners as delicately intimated that their ideas of value might not harmonize with those of this casual proposal, so it might be better to await developments. Dr. Simon was one of the earliest international authorities on the Porcupine field. He regarded the Rea definition as about the finest there was. He also unceremoniously condemned the Feldon claims, situated in the Foley-O'Brien-North Dome bailiwick — which may not have been so far wrong, at that.

This is not rancorous reminiscence. It has been a source of wonderment why the best-advised London mining groups have failed to participate in the Canadian developments; for James H. Curle, who carries weight with London, now proclaims that the most attractive gold fields in the world are those of the North Country and that they will continue so for the next twenty years.



The Mining Corporation of Canada and the Keeley are London controlled. Both had years of sorest travail. Beginning with the Townsite and those grotesque royalties imposed by the Temiskaming & Northern Ontario Railway, London elected not to make a profit out of ground that was maltreated until the Watsons, all three of them, arrived to direct and to operate. That the Mining Corporation achieved success is a tribute to the technical management, to the Canadian Directors, and to Cobalt. Of the Keeley, it is to be said frankly that it was foredoomed to the failure that overtook it before it was salvaged from the hands of the liquidator of the Farmers' Bank. Producer gas engines and the Welsh coal that came all the way to South Lorrain, "The engines 'ad to 'ave it"—never made the Keeley what it is, at the end of more than a decade of supposed operation. The correct judgment of J. MacKintosh Bell, and persistence of his principals, who are to be commended as an exceptional London control, enabled the Keeley area to assert its merits. Juxtaposed was the "brain storm" of "Black Jack", who lumped the Silver Queen and the Chambers-Ferland, and fathered the Aladdin, the avowed intention being to "show these wise 'Johnnies' that Cobalt is a deep Camp".

If London has found Canada too exacting or impossible, there are two sides to the story. Professor Frecheville, accompanied by Mr. Tyrrell, was in Porcupine before the railway. We saw him hit the trail—that awful mud route—from Kelso one sloppy morning. Mr. Leggett knew the Hollinger in detail in the earliest stages of its development. Max Francke, Government Mining Engineer under the Kruger régime, and subsequently a managing director in South Africa for Goerz & Co., personally investigated Porcupine. H. H. Webb of the Consolidated Gold Fields and his brother Louis, as well as W. Keene, had first-hand information. A roster of the prominent visitors is superfluous. More recently, when British Columbia had a force of American engineers following up the Premier Gold Mine development, London was represented by proxy. Yet the Selukwe is said to have the Premier extension.

Admittedly there is no sentiment in business, more particularly in mining. We desire London support and offer a share in the business. Canadians have money in Mexico and the Latin Americas. Perhaps they wish some of it were within reach. The West Indies and elsewhere have Canadian capital that could be advantageously employed in Canada. It is the prerogative of the wealthy to exercise discretionary rights, just as it is the privilege of the Gold Fields and National Mining to be jointly concerned with Anglo-American enterprises of magnitude, large enough for the largest, as it were.

No harm, however, will come at this juncture (when Canada is almost over-optimistic about its numerous mining fields and seeks capital) from attaining to a clearer conception of the situation as it exists. It is most opportune to confirm what the recondite H. G. Wells in "The Undying Fire", made Dr. Barrack maintain,— "Telling the truth is the very latest triumph of the human mind".

All repinings aside, it appears Charles V. Bob, a New York mining engineer, one of a group of business men acting as Comstock revivalists, was instrumental in having The Gold Fields American Development Company and The National Mining Corporation take a majority interest and assume the management and development of "fifteen properties controlling 11,116 feet or about two miles of the Comstock and other lodes".

Mr. Bob is "convinced that deposits of gold and silver which it was unprofitable to try to extract in the past, may be taken from the ground with modern methods employed on a large scale". A plant in operation at "neighboring properties" is "producing \$10,000 worth of gold a day".

Cash paid in on January 8 "plus that arranged for in the contract" with the incoming factors, amounted to \$3,485,000. No doubt the whole situation was thoroughly threshed out. Gold Fields Engineers would not be such if they did not know their business. Messrs. Amos F. Keene, Francis de M. Cunynghame and James Ronaghnam are on the Board for the British interests. The area is large and the \$20,000,000 capital has corresponding scope. Frederick R. Weeks is engineer-in-charge. The project is "all set", vendors evidently having been liberally provided for, the vendees always being able to look after themselves.

It remains for Canada to effect a rapprochement with London and its real Mining Groups. Those Groups have the money and the capacity to get more. They will learn that Canada is ready-made by natural creative forces, but they thoroughly understand that ready-made mines either are not for sale or are subject to keen competition. Concessions are essential on the part of those with substantial prospects, who might take a chance with investors who have vast mining interests and do not have to make stock distributions at ruinous discounts.

#### *Death of Henry Melville Whitney*

Daily newspapers of Canada (and elsewhere for that matter) have been singularly remiss in their comments upon the career of Henry Melville Whitney who died on January 26, at Boston, at the age of 84.

No individual did more for the Asbestos Industry, than did the deceased. He was one of its most optimistic pioneers. Yet no reference has been made to that fact. Perhaps he did not foresee the future of his handiwork, but he realized the economic worth of the unparalleled asbestos deposits of Quebec and if he did not profit to the fullest extent therefrom, the honors are his none the less. Even after he had co-operated in the standardization of the Asbestos Industry, there was an inexcusable lack of appreciation of the services he had rendered not only to Thetford and Black Lake but to the Maritime provinces, where he fathered the organization of Dominion Coal and was instrumental in obtaining a participation in the Wabana Iron Fields without which an iron and steel industry on the eastern seaboard would be less in evidence. "No American", it was truly said, "ever did more for Canada", than this New Englander.

Born at Conway, Massachusetts, in 1839, he started as a clerk in a general store. Subsequently he engaged in banking. It was while he was in the shipping business at New York, and was agent for the Metropolitan Steamship Company, trading between New York and Boston, that he became interested in Canada. He was always an advocate of Reciprocity between Canada and the United States, and he made that his leading issue in two campaigns for the Governorship of Massachusetts.

After the organization of Dominion Coal and Dominion Iron, he gave the same force and executive ability to the Asbestos Industry. He was identified with many great enterprises; his errors were those of optimism, notably his determination to find coal in Rhode Island.

Henry Melville Whitney had dropped out of the public eye in Canada. His memory should be preserved and cherished.



# Miners Repudiate "Red" Affiliation

## OFFICIAL STATEMENT OF THE POLICY OF THE UNITED MINE WORKERS OF AMERICA ON THE RED INTERNATIONAL OF MOSCOW

The United Mine Workers of America, which is the trade union of the coal miners, is the first among the great labor unions of this country to take a positive stand and announce a definite policy against the Red International of Moscow and its attempt to destroy the American legitimate labor movement and substitute therefore the principles of Bolshevism. This action has just been taken by the International Executive Board of the United Mine Workers of America, at a meeting held recently. Several months ago the District Organization of the union in Nova Scotia decided to affiliate with the Red International and sent an inquiry to the International office of the United Mine Workers as to the right of the District to effect such affiliation. The matter was referred to a committee of the International union for investigation and report, and the report was filed at this meeting of the board and it was adopted by unanimous vote of the twenty-seven members, representing every District in America. By this action the United Mine Workers of America placed itself squarely on record in opposition to the Red International and all that it represents. The report, which is vigorous in its treatment of the subject, is as follows:

Indianapolis, Indiana, January 11, 1923.

To the International Executive Board,  
United Mine Workers of America,  
Indianapolis, Indiana.

Gentlemen: — We, your committee to whom was referred the communication addressed to the International Executive Board by Secretary J. B. McLauchlan on behalf of District No. 26, concerning the validity of an application by said District to affiliate with the Red International, desire to submit for your consideration the following report of our findings.

Upon an examination of the program and constitution of the Red International, together with resolutions adopted at the last convention of this Organization, we find that among the objects for which the Red International was originally founded, it has for its purpose, first, control, and afterward the destruction of the bona fide trade union movement. The Red International is an outgrowth of the One Big Union, which went through its processes of major development in the north-western provinces of Canada during the year 1918, and like the I. W. W. and kindred organizations that preceded it, the One Big Union was doomed to inevitable failure, so much so, that in the year 1921 the Canadian trade union representatives were able to report to the American Federation of Labor Convention that the One Big Union practically ceased to exist.

An examination of the records of the International Executive Board, United Mine Workers of America, during this period will disclose the attempt that was made by a species of characterless adventurers and spokesmen for the One Big Union who sought to destroy the United Mine Workers of America in District No. 18 at that time.

The Red International is an organization similar in character and make-up to the One Big Union. Its

program and policies being so shaped that it not only sanctions, but in fact urges the workers to resort to street uprisings, mob demonstration, violence, or any other method that they may deem expedient for the accomplishment of their purpose. For example, section 45 of the Red International program reads as follows:

"The fundamental policy of the Trade Unions is the direct action of the revolutionary masses and of their organizations against Capital. All conquests of the workers are in direct proportion to the degree of revolutionary pressure they have exerted. By direct action it is understood every form of immediate pressure of the workers upon the employers and the state, such as: boycott, strikes, street, uprisings, demonstrations, seizure of factories, violent resistance against the removal of goods from factories and stores, and other revolutionary activity leading the working class to the overthrow of Capitalism and consolidating the working class in the Struggle for Socialism. The task of the revolutionary class-conscious Trade Union consists in transforming all the expressions of struggle into an instrument for the social revolution of the working class and its militant training for the social revolution and the establishment of the dictatorship of the proletariat."

Whilst section 54 of this same Organization's program, dealing with the question of collective bargaining, has this to say:

"The belief in the sanctity of collective bargaining propagated by the opportunists of all countries must be met with a resolute and decided resistance on the part of the revolutionary trade union movement. Collective bargaining is nothing more than an armistice. The owner always violates these collective contracts whenever the slightest opportunity presents itself. The respect toward collective bargains only proves that bourgeoisie conceptions are deeply rooted in the minds of the leaders of the working class. The revolutionary trade unions without, as a rule, rejecting collective bargains must realize their relative value and clearly define methods which will abolish these contracts when it proves to be profitable to the working class."

It must be apparent to all who read and think, that this program is in contravention to the policies, customs, practices and laws of the United Mine Workers of America. The membership of our great Organization not only believe in the principle of collective bargaining, but also the sanctity of contracts honorably entered into between the representatives of the United Mine Workers of America and the coal operators. In fact, this is the rock upon which our Union was founded, and in the practice of this policy we have not only made substantial gains in members, but we have also strengthened our Organization in power and influence.

The point of difference between the United Mine Workers of America and the Red International in this respect can be better exemplified by a reference to the following sections of our International Constitution:

"Section 2, Article 2 — To increase the wages, and



improve the conditions of employment of our members by legislation, conciliation, joint agreements or strikes.

"Section 10, Article 20 — Any member or members shutting down a mine in violation of Joint Agreement shall upon conviction by the District organization, suffer such penalty as may be imposed upon them by the respective District organizations."

It may not be amiss to also add that Section 2, Article 14 of the International Constitution, deprives from membership, and also provides other penalties for those of our members holding membership in a dual organization not affiliated with the Federation of Labor. It has come to our knowledge that the Red International is, in the estimation of the American Federation of Labor, a dual organization. Therefore, in accordance with the provisions of Section 2, Article 14, those of our members holding membership in the Red International will be required to pay the penalty provided in this Section, which reads as follows:

Mine managers, top foremen, operators' commissioners, persons engaged in the sale of intoxicating liquors and members of the Civic Federation shall not be eligible for membership.

"Any member accepting membership in the Industrial Workers of the World, the Working Class Union, the One Big Union, or any other dual organization not affiliated with the American Federation of Labor, or membership in the National Chamber of Commerce, or the Ku Klux Klan, shall be expelled from the United Mine Workers of America, and is permanently debarred from holding office in the United Mine Workers of America and no members of any such organization shall be permitted to have membership in our Union unless they forfeit their membership in the dual organization immediately upon securing membership in the United Mine Workers of America. Any member of the United Mine Workers of America who accepts office in any dual organization shall be permanently expelled from the United Mine Workers of America, unless reinstated by the International Executive Board."

Toward this union-wrecking movement the usual sentiment within the great and genuine trade unions is regret that anywhere working people can be found so woefully deficient in the knowledge of trade unionism that they will blindly follow the false teachings of the propagators of such movements. Invariably from their beginnings mushroom organizations of this kind are doomed through their faults of intention and organization to dissension, disruption and destruction. With the passing of time, less and less excuse exists for anything of their nature being brought into existence. Impatient resentment at social wrongs may prompt wild attempts for the abolition of capitalism. Organizations like the Red International may proclaim world happiness through the abolition of collective bargaining, or the inequitable wage system, but it remains for the trade union movement to continue its work with unflinching and direct practicability. It proceeds in safe steps from accomplishment to accomplishment as necessity develops, naturally one step after another. It takes no leap in the dark. It is our purpose to continue the onward march of progress to greater and better days for the United Mine Workers of America through the safe, sane, orderly and lawful methods of the American Labor movement. Our Organization has brought to its members notable and beneficial results, and in the performance of those

duties it is destined to ever go forward. We cannot subscribe, give comfort, or sympathy to the promotion of an Organization, whose chief claim to fame lies in its attempt to destroy institutions such as the United Mine Workers of America.

It is the decision of your Committee that no unit affiliated with the International Union, United Mine Workers of America, can in conformity with the constitution of our Organization, affiliate with the Red International. We would therefore recommend that District No. 26 be required to withdraw their application for affiliation with this Organization, and providing they refuse to comply with the decision of the International Executive Board on this question and affiliate with the Red International, that the autonomy of District No. 26 be suspended, the International Organization assume control of the government of the affairs of that District, and this status be maintained until it has been fully demonstrated that it is the purpose of the membership of District No. 26 to comply with this ruling.

### METALLURGICAL WORKS IN CANADA

The Mines Branch, Ottawa, has published its revised list of metallurgical works in Canada. This includes iron blast-furnaces, manufacturers of ferro-alloys, steel furnaces, rolling mills, nickel-copper smelters and refineries, copper smelters and refineries, lead smelters and refineries, tin smelter, zinc reduction works and refineries, aluminium reduction works, antimony smelter, magnesium reduction works, silver-cobalt-nickel smelters and refining works, Cobalt district customs concentrators and reduction works, and British Columbia customs concentrators. The Mines Branch, Division of Mineral Resources, Ottawa, states that one of the objects of publishing this list is to correct and keep up to date the files in their office, and ask that additions and corrections be sent in to them.

### BOOK REVIEW

YEAR BOOK OF THE SOUTH AFRICAN MINING AND ENGINEERING JOURNAL — Johannesburg, South Africa.—402 pages, price 10s. 6d.

This volume is called the "£1,000,000,000 Special Number", as the year 1922 marks the production in South Africa of mineral wealth of that huge value. Gold has contributed almost three-quarters of this amount, and diamonds almost the other quarter, coal and copper being a poor third and fourth at £54,000,000 and £23,000,000 respectively. It is noted that South Africa has provided 55.9% of the world's total production of gold, the United States, 15.3%, Canada 5.6%, Australasia, 5.0% and other countries lesser amounts. The Rand ore reserves show stupendous amounts of gold still to be extracted from the reefs, most of it of paying grade under present conditions.

Of growing importance to South Africa are the outlying mineral districts, and these are well described in the volume. The chromite and asbestos of southern Rhodesia, the Union's various important coal fields, the budding iron and steel industry and the diversified mineral products of the important Katanga region are all dealt with.

This is a valuable reference work on South African mining.



# The Mining Districts

BY THE JOURNAL'S CORRESPONDENTS

## NORTHERN ONTARIO

**COBALT.**—The first round drilled at the Beaver, after work was started on the property, resulted in the discovery of a 3-inch vein of high-grade. The Beaver has been shut down for several years, and has recently been re-opened after the Coniagas has arranged to finance and operate the property on a profit sharing basis with the Beaver.

**KIRKLAND.**—Recent results in the Kirkland Lake camp indicate that several consolidations may take place. It is announced that the Buffalo interests who, about a year ago, entered into an arrangement with the Kirkland Lake Proprietary for the development of the Sylvanite property on an equal basis, have arranged to purchase the whole of the property. The deal is an important one, running into several hundred thousands, the purchasers being interests connected with the Wright-Hargreaves. The Sylvanite lies between the Tough Oakes and Wright-Hargreaves properties, and is the most important undeveloped property in the camp. It is logical to assume that when the property is developed to the stage where a mill is required, it will probably be amalgamated with the Wright-Hargreaves. The Sylvanite shaft will be sunk below the 500-foot level, and a larger mining plant is to be installed.

The Wright-Hargreaves management is already talking about increase the mill capacity, and if developments to the 1000-foot level compare with those in the upper levels, the enlargement will be proceeded with. The shaft is now down to the 900-foot level, and levels are being opened up at 750 and 850 feet. The ore is averaging \$12.00 per ton, and substantial profits are being made.

A report of the Kirkland Lake Proprietary for the year ending June 30th, 1922, shows a recovery of £4,105, against expenditures of £29,800. The mill was only started in the latter part of the fiscal year, and between the end of June and the end of November \$75,000 in gold was produced. The directors state that a representative of the company is in the United States negotiating with American interests for the sale of the properties. The prospective purchasers of the Tough-Oakes and the Burnside are understood to be the Continental group.

Further details regarding the purchase of the Orr property by the Teck Hughes do not show the deal in quite as favorable a light as was originally announced, but, notwithstanding, indicate that the Orr was taken over at a price which will be satisfactory to the Teck-Hughes. Negotiations have been under way for several months, and the Teck-Hughes officials are satisfied with the terms. It was originally announced that the consideration for the Orr was to be 600,000 shares of Teck-Hughes stock, and this stock was to be obtained by increasing the capital from 4,000,000 shares to 5,000,000 shares of \$1.00 par. It is now announced, however, that the 600,000 shares of Teck-Hughes will purchase the 1,050,000 shares of the Orr Gold Mines belonging to Conrad E. Wettlaufer and associates of Buffalo. Arthur E. Moysey & Company own 730,000 shares, and are to receive 35 cents a share in cash. There

are an additional 61,000 shares in the hands of the public, and the Teck-Hughes will be authorized to purchase these at 35 cents. This will represent a total cash outlay of approximately \$275,000, in addition to the 600,000 shares of Teck-Hughes stock. A meeting of the Teck-Hughes is to be held on February 1st, at which the necessary by-laws to cover the different purchases will be ratified. The Orr Gold Mines own a considerable acreage adjoining the Teck-Hughes, and the main vein of the Teck-Hughes passes through the corner of the Orr property. Ore reserves on the Orr property are stated to be \$2,000,000, and as the vein dips to the South it will have an increasingly greater length in the Orr property as greater depth is attained.

Shareholders of the Bidgood Gold Mines will meet on February 1st to consider, and if deemed advisable, to ratify a by-law increasing the company's capital from \$2,000,000 to \$3,500,000. Of the new stock 625,000 shares are to be used to purchase two adjoining claims, and it is understood that the additional stock will be sold to finance development.

**BOSTON CREEK.**—It is understood that English interests have offered to purchase 1,600,000 shares of the Baldwin Gold Mines at 2 shillings a share. This would include 400,000 shares of treasury stock and would mean approximately \$180,000 for the treasury. While it is not stated, it is assumed that this is an option and not a contract to purchase. Some good ore was recently found on the Baldwin, but as far as can be learned there is nothing to justify any such price as stated above, except on an option basis with time payments.

A. D. Miles, representing English interests, is commencing diamond drilling on the Walsh claims in Catharine Township. The option on the Skead Gold Company's properties has been dropped, and the drills have been pulled off.

A short report of the Kirkland Gateway Property indicates that favorable results have been met with. The company is calling for tenders to sink the shaft from the 265-foot level to the 500-foot level.

**PORCUPINE.**—The report of the McIntyre for the quarter ending December 31st, shows gross recovery of \$608,000, as compared with \$586,000 for the preceding quarter. The total recovery for 1922 was \$2,140,000, which constitutes a record in the history of the company. As the output for the first six months was \$945,000, a substantial increase in the latter part of the year is indicated. Due to heavy development charges, which includes a good deal of shaft sinking, profits for the last quarter show a slight decrease as compared with the quarter ending September 30th, and amounted to \$260,000 against \$268,000. The shaft is now down to a total depth of 2300 feet, which is the deepest in the Porcupine district.

The Dome report for the nine months ending December 31st, shows gross profits of \$1,975,000. After deducting \$94,000 for estimated Dominion Taxes and \$421,000 for depreciation of plant and mine exhaustion, the net profits amount to \$1,460,000, which is considerably in excess of dividend requirements. The directors have announced that next July a dividend of



\$1.00 a share, on the new stock, will be started, and to insure a continuance of this dividend, a special fund, called the "Dividend Assurance Fund", with \$1,003,000, has been created. This will be added to until it amounts to a full year's dividend. The balance sheet shows a strong cash position, and the amounts included, Bonds — \$481,000, Dividend Assurance Fund — \$1,003,000, loans on call — \$1,119,000, inventories — \$300,000, Bullion in Transit — \$62,000 and cash — \$329,000.

The Goldale bungalow and cook camp were burned down a few days ago. Five men were sleeping there and they had a narrow escape from being burned to death. Among them were Harry Kee, the manager and T. H. Rea and all of them had to get out in their night clothes. Three of the men received minor cuts and burns and had to be taken to the hospital. The fire started from an overheated floor.

### NORTHWESTERN ONTARIO

**PROSPECTORS CLASSES.**—Dr. W. L. Goodwin, mineralogist of the Ontario Department of Mines, Toronto, is at present holding Prospectors' Classes in the rooms of the Port Arthur Chamber of Commerce. Morning and afternoon sessions are being held, at which a thorough grounding in the principles and practice of prospecting for minerals is given, followed each evening by an illustrated lecture by Dr. Goodwin, where a complete set of lantern slides are thrown on the screen and fully explained to the students and audience by Dr. Goodwin, with his well known facility for imparting geological information. Both the classes and lectures have been well attended, but not quite up to what might be expected in a country abounding in mineral wealth, the possible mineral areas of which are constantly being extended into new fields that offer the greatest inducement for well equipped prospectors to carry on intensive and intelligent prospecting. The classes and lectures will be concluded on the 27th, and a similar course will be commenced at Fort William on the 29th, under Dr. Goodwin.

**RED LAKE.**—News of the north has just been brought in by Findlay McCallum, of Fort William, who has been prospecting in the Red Lake district in northwestern Ontario for a Winnipeg syndicate comprising J. E. Botterell, S. E. Richards, and W. P. Fillmore. Mr. McCallum reports interesting finds of both silver and copper. Supplies will be taken in during the winter over the trails from Sioux Lookout, a distance of 175 miles to the claims. Considerable staking has been done; one report says 1000 claims have been staked, and a large majority of them recorded, with every prospect of this area showing great activity during the coming summer.

**IRON ORE COMMITTEE.**—Mr. G. S. Cowie, representing the Ontario Iron Ore Committee, met the Port Arthur Chamber of Commerce on the 16th, when a strong memorial was presented covering the various iron ranges in northwestern Ontario, outlining the character, quality, and possible tonnage of the different deposits, together with the modes of beneficiation applicable to each, and, pointing out the necessity for the development of our iron ores throughout the Province, and the need of some Government assistance to bring about the establishment of a permanent iron ore industry within the Province. The memorial presented to Mr. Cowie asked for a straight cash bounty of not less than fifty cents per long ton, on the finished prod-

uct. It was the considered opinion of the Chamber that this form of assistance is preferable to any other, for the reason that the treatment the ores must be subjected to, to fit them for furnace use, vary so greatly that if the Government undertook to finance beneficiating plants, the number of such plants that would be asked for would run into prohibitive figures, whereas a cash bounty would only involve the Government to the extent of the bounty given on each ton of finished product, the whole risk of production being taken by the iron ore operators.

### NOVA SCOTIA

**THE RADICALS RECEDE?**—If the Executive of District No. 26, United Mine Workers of America have any desire to recede from the position they took when they decided to join the 3rd International, Moscow, they have now a splendid opportunity. The Cumberland and Pictou county miners have always openly opposed this unspeakable yoking together and are more decided in their protests today than ever. Besides, there has been a cooling of the ardor of a large number of the Cape Breton "Reds", who upon reflection find they are not ready to give up the time-honored institution of their land and follow strange gods. Indeed, there has been a growing resentment towards those who would beguile them to industrial and social destruction. The silence of the leaders on this question during the past months has been eloquent of unexpressed doubt as to the prudence or propriety of going through with the job.

And now the International executive thunders its anathema on ail, even the whole district, should the application to the "Russian Reds" not be withdrawn. There is no mistaking the language and tone of the "International Mandate". The district will lose its authority, and be governed by officers appointed by International Headquarters should it fail to respond to the instructions sent to Secretary J. B. McLachlan, to keep clear of Moscow affiliations.

**SHORTAGE OF SKILLED MINERS.**—The output of the Dominion Coal Company having increased during the last six months, it was found necessary to increase the number of skilled men at the coal face. Application was made to the Government by the Company for permission to have more men supplied. The President of the United Mine Workers opposed this application on the grounds of low pay and other such reasons. This is the men who, when the agreement was entered into last August, expressed the wish that the coal industry would have a good year.

If the coal output is to increase it can only do so by having the necessary supply of skilled miners. The native supply of Nova Scotia miners is exhausted and others must be found outside the province. Without additional skilled workmen there can be no large increase in the output of coal.

Increased output means lower costs and therefore larger sales. At a time when the Coal Company is making gigantic efforts to extend the scope of the market it would be unwise on the part of any Government to put any obstacle in their way. All the Nova Scotia collieries are working steadily in the face of the statement about low wages made by President Livingstone, good wages are being earned.

**WABANA.**—Wabana Ore mines report conditions quiet and that they will remain inactive until spring time.



## BRITISH COLUMBIA

**THE B. C. SILVER STRIKE.**—The recent phenomenal rise of shares of the Selukwe Mining Company of Rhodesia on the London market, the advance being from about eight shillings to around twenty seven shillings, is explained by the reported opening up of a new pre-body on the Portland Canal holdings of a subsidiary concern, the B. C. Silver Mining Co. Of this development it is authentically stated that a twenty foot vein of fair ore in fissures in quartz porphyry has been cut. This, no doubt, is an extension of one of the Premier Mine fissures, according to authoritative information. The news was cabled to London and the effect was quickly registered in market quotations on the stock of the company. The demand was accelerated by the recent announcement of the dividends being paid by the Premier Mining Company, which is operating in the district in which are located the Selukwe holdings.

**PORTLAND CANAL.**—The second payment has been made by A. B. Trites, vice-president of the Premier Mining Co., and his associates on the Big Missouri and Unicorn groups of mineral claims, which they have bonded and which are situated in the Portland Canal Mining Division. This means that development will be continued next summer. Last year a force of about 35 men was employed on the Big Missouri, the work being largely exploratory and prospecting.

A rawhide trail has been constructed from the Fish Creek property of the Amercian Mining & Milling Co. to the Salmon Valley road and already substantial shipments of high-grade ore have been made via this route to the tidewater town of Hyder, Alaska. A Sullivan compressor has arrived and is being taken over the winter trail to be installed at the mine.

The Silverado group of mineral claims, situated at an elevation of 4,000 feet on the mountain east of the town of Stewart and above the mouth of the Bear River, has been taken over on a working bond by the Silver Bell Mining Co., of Seattle, Wn.

The demand for a ready means of quickly performing preliminary development work on promising prospects in the Portland Canal Mining District has led to the organization of the Hetu Mining Contractors Ltd. Their stock in trade will be portable mining machinery, including portable compressor equipment. Their officers are mining men of Prince Rupert, Alice Arm and Stewart. Already one of these plants is in the field and others will be provided as orders are received.

**PIONEER MINER DEAD.**—R. T. Ward, prominent in British Columbia mining circles through his association with the Bullion Mining Co. of the Cariboo, died on Friday, 19th January, at Vancouver. He came to this Province in 1866 and was among those who stampeded to the Cariboo in search of gold. His interest in the mining possibilities of the great interior plateau never ceased. With some associates he acquired the holdings of the Bullion Placer Mining Co. Title, however, was disputed by John Hopp, another Cariboo miner. The case was fought through all the courts, victory finally going to Mr. Ward in the Privy Council. Steps, it is understood, have been under way with a view to the re-opening and the placing of these famous leases on a productive basis.

**TELKWA.**—New York financial interests are reported to be backing T. E. Jefferson, of Telkwa, in the development of fifteen gold bearing mineral claims situated on Dome Mountain. The properties are about twenty miles north of the town of Telkwa.

**CARIBOO.**—A mild winter is being experienced in

the Cariboo, which is proving a boon to Cedar Creek miners. The work of the latter, it is stated, is being carried on without interruption and several shipments of gold have been made recently. An important quartz discovery is reported near the town of Clinton upon which development will be started as soon as the snow leaves.

**YMIR.**—The Goodenough fraction and several adjacent claims, Wild Horse Creek, near the town of Ymir, have been shown to be promising prospects and the properties now are Crown Granted. The ore-shoot of the old Ymir Mine is said to have been found in these claims and important developments are expected in the course of the next season's work.

**KOOTENAY.**—Harold Lakes, superintendent of the Selkirk Mines Ltd., reports that ore is being sacked at the Kootenay Bell Mine, one of the group controlled by the company, for shipment to the Trail Smelter. The construction of a tramway to the Nugget Mine mill is planned to facilitate transportation of ore for treatment.

**TRAIL ORE RECEIPTS.**—Ore receipts at the Trail Smelter, Consolidated Mining & Smelting Co., for the first two weeks of January totalled 18,401 tons, 836 tons being received during the first and 9965 tons during the second week. Receipts for the second week were as follows: Black Rock (Zinc) Northport Wn., 242; Knob Hill (dry ore) Republic Wn., 310; Lone Pine (dry ore) Republic Wn., 178; Molly Gibson (lead), 77; Paradis (lead), Invermere, 88; Quilp (dry ore) Republic, 236; Sally (lead), Beaverdell, 35; Silver-smith (lead), Sandon, 269; Sliversmith (zinc), 48; Surprise (dry ore), Republic, 209; company mines, 8899.

**NELSON.**—The properties of the California Mining Co., situated near Nelson, which reverted to William Moore through failure of the J. R. Cassin Company, Spokane Wn., to make a final payment, are expected to be active in a short time. Ernest Watson and associates have bonded the Union group of three claims. Further development is to be done in the old workings of the Union Mine and a considerable quantity of ore on the dump is to be sorted and shipped to the smelter. Mr. Watson is having the road opened for the transportation of supplies. The California group of claims is under option to James Dinsmore, of Seattle Wn., whose inspection of the property is reported to have satisfied him of its possibilities.

A new corporation has been formed bringing under one management the Burrall & Baird Dredging Company, the New Northwest Corporation, the Canadian Klondike Power Company and several allied companies operating in the Klondike gold fields. These companies control about 100 miles of the old Klondike gold creeks which will be worked by dredge and hydraulic. It is estimated that there are twenty years of work ahead. There are three dredges and many hydraulic plants in operation at present on Dominion Creek and in the Klondike valley. Warren H. S. Macfarland has been appointed general manager succeeding Frederick P. Burrall, who has resigned to accept another important position connected with American mining interest. He, however, will remain as advisory engineer to the Klondike concern.

Trial of a carbonizer, developed by the Bureau of Mines, Washington, to carbonize Western Canadian lignites, will be made, and, if found satisfactory, will be installed to replace the carbonizers developed by the Lignite Utilization Board at Bienfait, Sask. This was decided at a meeting recently in Winnipeg of Provincial and Federal Government representatives.



Three million horsepower of electrical energy was developed from Canada's waterfalls during 1922, of which 1,330,000 was in Ontario, 1,100,000 in Quebec, 310,000 in British Columbia and the remainder distributed between Manitoba, Alberta, Nova Scotia, New Brunswick and Prince Edward Island. It is estimated by the Federal Water Powers Branch that the horsepower development per 1,000 of Canada's population, is 337, the total capital invested in the development \$620,658,731, and the estimated revenue is \$81,600,000.

Brazil, with thirty million inhabitants and an area as large as Canada, has only 20,000 miles of railway. The United States, with a slightly smaller area, has 250,000 miles of railway. Brazil's hinterland, back from the coast and the chief navigable rivers, is but little developed and has only a sparse population.

In the state of Victoria, Australia, there is a dearth of waterpower for the generation of electricity. Recourse is being had, therefore, to the beds of brown coal that occur at the surface in the Morwell field, as a source of cheap power. This fuel contains 50 per cent. of water and has a calorific value of 4,800 B. T. U's. The coal will be "mined" by steam shovel and burned under boilers to make steam for turbo-generators. The fine coal, which is not suitable for firing direct, will be briquetted, the briquettes to contain 12 per cent. moisture with a calorific value of 9,300 B. T. U's. It is intended to use these briquettes also for domestic and general industrial purposes. At present about 1200 men are employed in establishing this vast undertaking.

The drop in the price of copper from war-time levels has paralyzed the Australian copper industry, though it is founded on comparatively rich and abundant ores.

The director of the United States Mint makes a preliminary estimate of the gold production of the United States of America for 1922 as 2,375,019 ounces valued at \$49,096,000. This total is \$971,000 less than the product of 1921, and less than half of the record production in 1915 of \$101,035,700.


S

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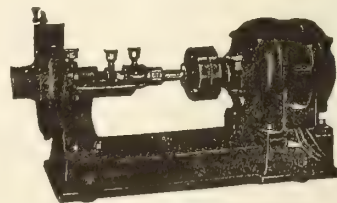
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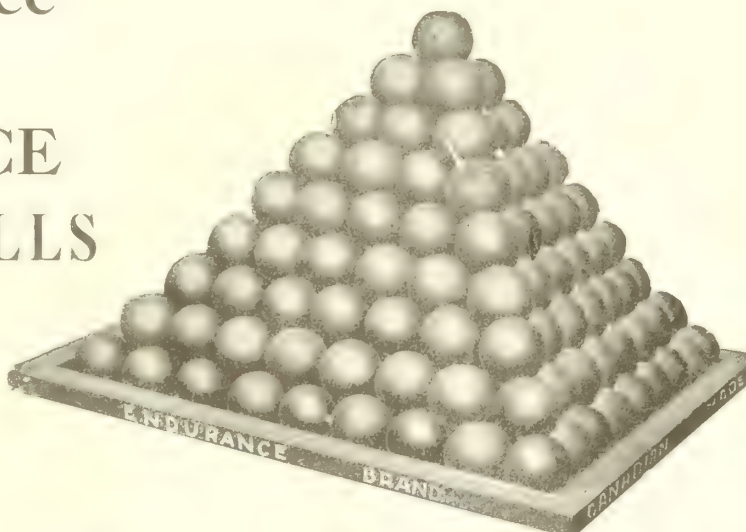
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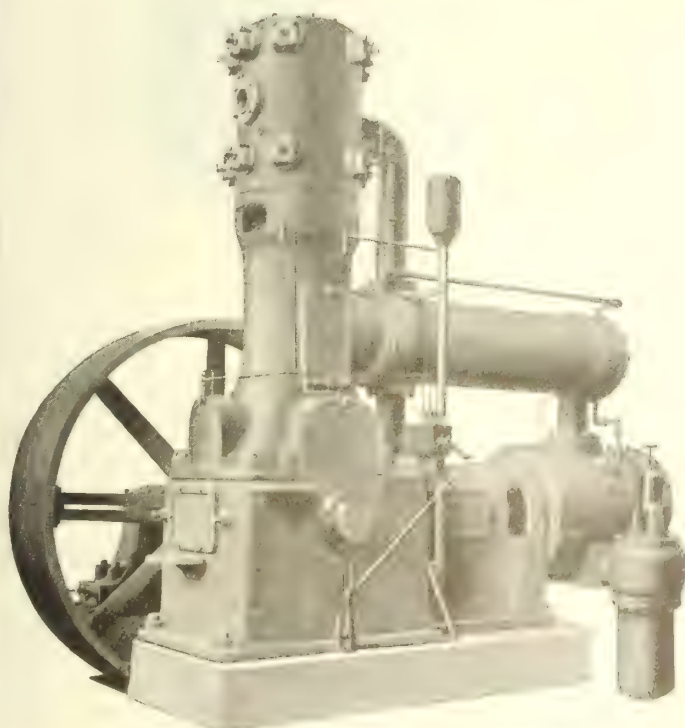
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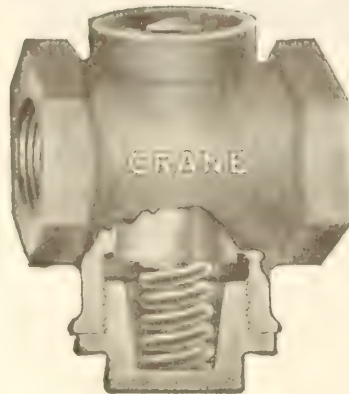
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**Tested under Air Pressure. Suitable for 125 pounds air pressure and 175 pounds cold water working pressure.**



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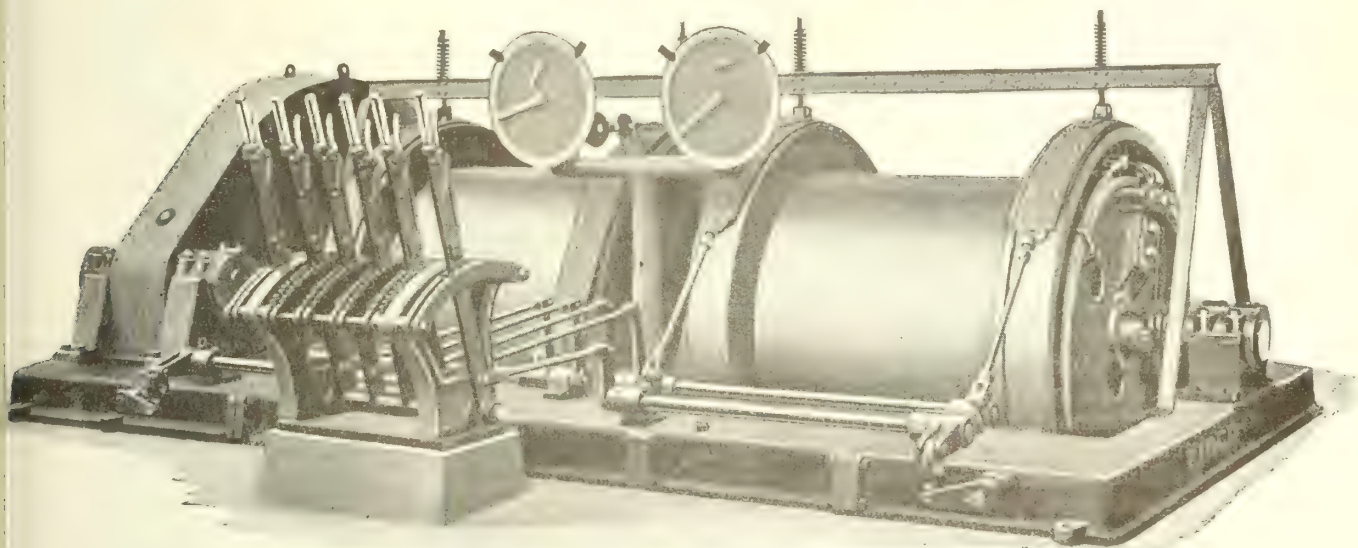
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When desired, we will be glad to study conditions at your mine and then recommend the size, type and equipment of the hoist best adapted to meet them safely and economically.

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# Ontario's



# Minerals

PROVINCE OF ONTARIO

DEPARTMENT OF MINES

HON H. MILLS, Minister of Mines

## Mineral Areas.

Ontario, with its 407,262 square miles, contains many millions of acres in which the geological formations are favorable for the occurrence of minerals, 70 per cent of the area being underlain by rocks of pre-Cambrian age. The phenomenally rich silver mines of Cobalt occur in these rocks; so also do the far-famed nickel-copper deposits of Sudbury, the gold of Porcupine and Kirkland Lake, and the iron ore of Magpie and Moose Mountain mines.

## Economic Minerals.

In addition to the above, practically all economic minerals (coal and tin excepted) are found in Ontario:—actinolite, apatite, arsenic, asbestos, cobalt, corundum, feldspar, fluor-spar, graphite, gypsum, iron pyrites, lead, mica, molybdenite, natural gas, palladium, petroleum, platinum, quartz, salt, talc and zinc. This Province has the largest deposits on the continent of talc, feldspar, mica and graphite.

Building materials, such as ornamental marble, limestone, sandstone, granite, trap, sand and gravel, lime, portland cement, brick and tile, meet every demand.

## Mineral Production.

Preliminary returns show the output of the mines and metallurgical works of the Province for the year 1921 to be worth \$48,128,387, of which the metallic production was \$27,574,202.

The following figures show the rapid growth of Ontario's mineral industry by five-year periods since 1891:

| Year.         | Value.      | Year.         | Value.       |
|---------------|-------------|---------------|--------------|
| 1891 .. . . . | \$4,705,672 | 1906 .. . . . | \$22,388,383 |
| 1896 .. . . . | 5,235,003   | 1911 .. . . . | 41,976,797   |
| 1901 .. . . . | 11,831,086  | 1916 .. . . . | 65,303,822   |

## Dividends.

Dividends and bonuses paid to the end of 1921 amounted to \$23,140,734 for gold mining companies, and \$84,388,185 for silver mining companies or a total of \$107,528,919.

## Mining Regulations.

A miner's license costs \$5.00 per annum, and entitles the holder to stake out in any or every mining division three claims of 40 acres each. After performing 200 days' assessment work on a claim, patent may be obtained from the Crown on payment of \$2.50 or \$3.00 per acre, depending on location in unsurveyed or surveyed territory.

## Assay Office.

The Provincial Assay Office at No. 5 Queen's Park, Toronto, is maintained by the Department of Mines for the free identification of minerals, free assays under the provisions of the Mining Act of Ontario, and also for general assay work as per the Schedule of Charges which may be obtained on application.

## Temiskaming Testing Laboratories

The Department maintains, at Cobalt, an ore sampling and testing laboratory which is now prepared to receive parcels of gold ore from 100 pounds upward, and after sampling and assaying the same to pay to the shipper the value thereof, less treatment charges. The purpose is to afford a market for ores extracted by prospectors and others in developing their mining claims, enabling them to obtain funds which they can use for further work and to report on the most satisfactory method of treatment. Fuller information may be obtained on application to the Manager, Temiskaming Testing Laboratories, Cobalt, Ontario.

## Publications.

For list of publications, illustrated reports, geological maps and mining laws, apply to

THOS. W. GIBSON,  
Deputy Minister of Mines,  
TORONTO, CANADA.

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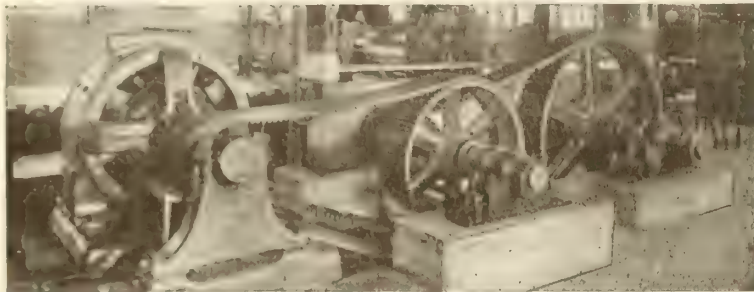
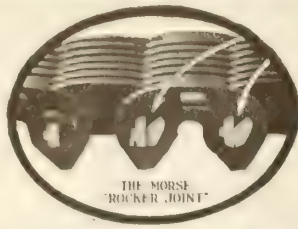
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# MORSE CHAINS



A few of the Morse chains in use at the Raymond Lead plant

Using chain drives speeds up production, cuts belt expense and overtime wages and operates with practically no repairs.

Write for Booklet

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**Jones & Glassco, Regd.**

MONTREAL, TORONTO.

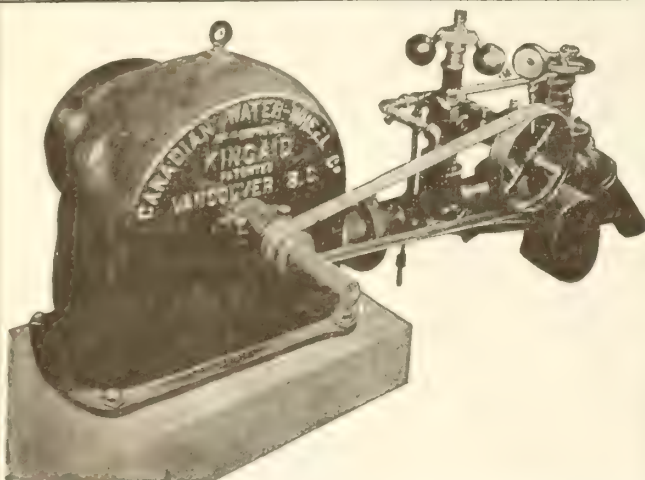
O. W. Ludwig, Plant Superintendent of the Raymond Lead Co., Chicago, says:

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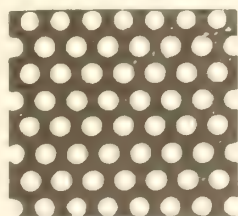
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## -:- EDITORIAL -:-

*Of all the industrial arts which contribute to the progress and welfare of mankind, we may claim the most important place for mining and its hand-maiden, metallurgy.— R. G. Leckie — 1897.*

### WHAT'S WRONG WITH THE INSTITUTE?

Numerous members of the Canadian Institute of Mining and Metallurgy are asking themselves and others this question, and the diagnosis presents a wide variety of conclusions. The principal point of agreement is that something is wrong and that steps must be taken to cure it.

Any who doubt that something is wrong need only study the facts of the recent election of officers for the coming year—the election is already complete—and their doubts will be resolved. We print the list on another page. It is a notably appropriate council we have elected (or selected) and one that is sure to exert itself to the full of its ability on behalf of the Institute. The regrettable feature is that branches and private members have taken as little interest in their Institute that the election is uncontested. Worse than that, the minutes of Council record the fact that a large fraction of the incoming executive were appointed by council, on account of the failure of some of the branches and of private members to nominate candidates. We are sure that the members of the incoming Council would be much better satisfied had their election been the result of a well-fought contest with worthy opponents. The Institute's elections have fallen flat, and the honour of election has lost much of its former meaning.

One discriminating student of Institute affairs has come to the conclusion that the introduction of the letter ballot and the other features of a highly-organized mechanism have "killed" the camaraderie and the will to work for the Institute that was so notably characteristic of the first fifteen years or so of its existence. It may be that this spirit can be reclaimed only while there is a comparatively small number of members, and that the larger organization with its necessary perquisites has of necessity excluded these former features. At any rate it is more a matter of record that the letter ballot both for elections and for changes in the by-laws has failed to attract interest, since the vote nowadays is even smaller in proportion than was the standing vote in the annual meeting under the old regime.

Our own opinion is that the present case is by no means hopeless. The human element still remains, and

acterized the former activities of the Institute is still available, and indeed is available in greatly increased amount. It is not now being used on behalf of Institute affairs in the degree to which it can be and must be used if the Institute is to fulfil its mission. The incentive due to personal contact and to rousing meetings has to a large extent disappeared, and nothing adequate to the need has taken its place. We have attempted to replace human intercourse with a mechanism, and our attempt has ended in failure. By hook or by crook, we must make the Institute more human and less mechanical, if it is to retain its present grip on the mining industry and regain what it has lost. This idea is, we believe, in the minds of most of those who have grappled with the Institute problem during recent years, though few have formulated it clearly.

What expedients the Institute should adopt in pursuit of this end, we do not presume to decide off-hand. It is hardly possible to return to the conditions of "the good old days". The step must be a forward one. The Secretary's "forward movement" is in the right direction, but it has not gone to the mark. We have suggested that the pursuit of the objects of an exclusively professional society by those now, and in the future, classed as professional members might prove to be the bond of union that now is lacking, as well as an adequate incentive. The Western members would make the whole Institute thus homogeneous by excluding a large fraction of the present membership—a course we consider impracticable as well as inexpedient and unnecessary. Other proposals will, no doubt, be made.

What we must all bear in mind is that any and all attempts to convert the Institute into a smooth-working machine are bound to be detrimental; a machine is not human, and if human interest is lacking, the human beings that constitute the membership will inevitably fall away from its active support. The reading and discussion of technical papers is not enough. Activity in the pursuit of a just cause and its active defence have been the making of many a so-called nation of gentlemen and even nations. A cause worthy of our attention is the protection of our mining industry from frauds and fakirs—a cause the Institute has not of recent years sup-



ported with more than empty words. There is plenty of human activity in such a cause; in fact it is composed of human interests throughout.

We hope that at the Annual Meeting in Montreal a month from now there will be a broad-gauge discussion of this matter that will elucidate the principles involved. The attention of the meeting is more likely than not to be directed to inconsequential details and side issues unless a number of the members take pains beforehand to focus their attention on the main issue. We bespeak the attention to this of all those interested in the welfare and progress of the Institute.

### THE SYMBOLIC AND THE ABSOLUTE

Progress in science implies the continuous readjustment and revision of ideas and ideals.

Take a recent instance. Scientists now have reason to think that graphite and, possibly, the diamond may no longer be considered pure carbon. Researches conducted by Sir William Bragg indicate the probability of graphite being a compound of hydrogen and carbon. This conclusion is based upon recondite study of atomic structure. Not only is this indicative and characteristic of the far-reaching results of modern speculative research but, from the fact that it has an unexpected bearing upon the utilization of coal, it is a remarkable illustration of the utility of the most refined scientific investigations.

This induces introspection. As a foundation for thought we have been compelled to accept certain arbitrary symbols that represent the absolute. As convenient datum points we postulate a number of primary elements, irreducibly minute atoms, absolute zero, final special and dimensional relationships, and admittedly inadequate concepts of energy and matter. Step by step we have outgrown these concepts, have modified them more or less timidly, but we are loth to discard them.

All sciences are advancing and expanding at a rate that is bewildering. "Facts" are sought, and there are ever-multiplying facilities created to aid the seeker. In no fundamental science has there been a more ardent search for ultimate truth, a more persistent rejection of non-essentials, than in geology. And yet geological thought today is still strongly tainted with reactionary ideas. The scholiast, who is also the seiamachist, has far too much to say; the practical geologist has far too little. We accept symbols that are outworn and talk that is talk *et praeterea nihil*. Phrases become formulae, and formulae become sacred. A little irreverent questioning of authority is needed.

Bold speculation is as necessary in geology as in mining. Our tendency to accept a *credo* because it has currency, is something to be guarded against. We need not pull down the temple, but we should ventilate it.

### PROGRESS IN KIRKLAND-LARDER-ROUYN GOLD FIELD

The band of Temiskaming sedimentary rocks extending from Kirkland in Ontario to Rouyn in Quebec, and beyond in both directions, promises to be the centre of mining development activities in the north country during the coming season. Already sufficient of its wealth in gold has been disclosed to warrant the attention of a large number of substantial mining companies and syndicates, and an unusually large number of showings are being carefully examined and developed. Though there is, no doubt, a certain fraction of good ground being withheld from active development by the blanketing tactics of speculators who will neither spend the money required nor concede reasonable terms to others who are ready to spend it, still the district is, generally speaking, in good hands.

In 1910-11, when the eastern part of this area in Quebec was found to be gold-bearing, Dr. M. E. Wilson of the Geological Survey, Ottawa, commenced to map it. The Bureau of Mines, Quebec, also paid some attention to it. For some unaccountable reason both these departments failed to carry on this mapping, though it was obvious that the region held a great deal of promise for the prospector and that what the prospector needed most was the guidance of the geological maps that our pioneers geologists are so eminently capable of providing.

A year ago the need for the geological mapping of this area in Quebec became so pressing and it offered such an inducement for direct service to the mining industry that the Director of the Geological Survey sent in two parties under Dr. H. C. Cooke. It so happened that prospectors in large numbers also penetrated the field, and there is no doubt that this intimate association of geologists and prospectors had its usual fruitful result.

There still remains a large amount of mapping to be done in the new Quebec area before the geologist will have fulfilled the whole of his mission in co-operating with the prospector. Last year's work was merely a beginning, and there is no doubt that the Director of the Geological Survey, as well as the officers of the Quebec Bureau of Mines, have borne this fact in mind when planning for the activities of the coming season. It may be noted, by the way, that the request of some of those interested in the Kirkland field that Dr. Cooke be authorised to make a detailed examination there and thereabouts is singularly inopportune, not only on account of the urgent need of mapping further east in Quebec, but because the Kirkland field has been studied thoroughly already; in fact a new report and a new map are now in course of preparation by the Department of Mines in Toronto. When geologists are so few, a mining community should not ask to have its bread spread with jam on top of the butter!

Looking forward, we can hope with some reason that the new gold district will escape the orgy of speculation that has crippled all, and killed some, of our embryonic mining camps. Prospectors, investors, examining engineers and even promoters seem to be possessed of more of the spirit of sweet reasonableness than ever before. We hope it will prove to be so, and that the end of the next season will show the belt of payable gold veins that commences at Kirkland extended well into the province of Quebec.

#### EDITORIAL NOTES

Our Northern Ontario correspondent records today the progress during January of the new Violet shaft of La Rose Mines, Cobalt. He states that 155 feet 2 inches in one month is a record for Ontario, if not for Canada. The rock of the mineral districts of Northern Ontario is typically hard, so that it is not likely that a world's record will ever be set in those parts. Such a monthly footage as that recorded demonstrates, however, not only the remarkable advances during recent years in the mechanisms and technique of drilling and blasting, but the wonderful durability of the modern rock drill even when up against hard rock.

The phenomenally wide face of ore recently opened up on vein 26 in the Keeley mine, South Lorrain, Ontario, was officially inspected last week, by Mr. Cyril W. Knight of the Ontario Department of Mines. The photograph shows ore of a maximum width of a full five feet, which is said to average 5,000 to 7,000 ounces of silver to the ton. Even a casual inspection of the ore shows that it is amazingly rich. This bulge in the vein is a "freak", and an interesting one. The really important point is that a new ore-shoot, averaging seven inches in width of unusually high-grade silver ore, has been disclosed in a drift for a length of 58 feet, and at last report was still going strong.

At last the Hollinger Mine is assured of sufficient power to permit of its maximum production of gold. The Minister of Lands and Forests in Toronto proposed terms to Hollinger officials last week that can be accepted by the company. The terms include adequate protection of the rights of the numerous other interests concerned — the Abitibi Paper and Power Company, the T. and N. O. Railway, the town of Cochrane, and the people of Ontario. What appeared formerly to be mere obstruction on the part of the government in Toronto is now seen to be principally the uncertainty consequent upon the number and diversity of the interests involved, though the delay in a settlement was undoubtedly prolonged on account of the provincial administration's comparative inexperience in the handling of large financial affairs. However, all's well that ends well, and now we shall see

the Hollinger outdistance all the world's records for gold production.

In discussing "Canadian Iron Ores" editorially in a recent issue, *The Mining Magazine*, London, notes the appointment of Hon. Harry Mills' Committee on Iron ore and continues: "A perusal of the Report on 'British American iron ore resources issued by the 'Imperial Mineral Resources Bureau leaves a gloomy feeling, and arouses something in the nature of commiseration with this new committee with regard to 'the unattractiveness of the duties which they have 'undertaken.' We hope the case is not as bad as that!

#### HISTORY — IV

##### THE FIRST ASSAYER

The first assayer, doubtless,  
 Attended Nature's school;  
 He did his work all cloutless,  
 And improvised each tool.  
 In smelting metals native,  
 It seems a patent fact,  
 Results were qualitative,—  
 They could not be exact.  
 Yes, primitive and simple  
 The first assayer was;  
 No more than any pimple  
 He knew of chemic laws.  
 Yet that he was resourceful  
 I'd freely bet my life:  
 For, not one whit remorseful,  
 The Mother-of-his-Wife,  
 When bone-ash moulds were needed,  
 He slew and burned to dust;  
 Her cries he little heeded,—  
 He had an awful crust.  
 Her tibia he saved it  
 And polished it with care,  
 And with a legend graved it  
 In symbols large and fair.  
 "Eureka!" ran the graving,  
 "I've got the stuff at last  
 For which the world is craving,  
 "The Age of Stone is past.  
 "What weapons I can fashion!  
 "What implements design  
 "For men to do their bashin'  
 "What tribute will be mine!  
 "So, e'en though she was hateful,  
 "That Mother-of-my-Wife,  
 "To her shall I be grateful  
 "Through every day of life."  
 For he had smelted copper  
 From out of weathered stones,—  
 Used a cupel, a whopper,  
 Made out of female bones.

J. C. M.



# Gold and Silver at Schreiber, Ontario

BY P. E. HOPKINS

The mineral deposits of the Schreiber-Duck Lake area were described by the writer in a 1921 publication\* of the Ontario Department of Mines, which was accompanied by a colored geological map. Since that time a silver discovery has been made; hence the writer returned to the area for a few days in November 1922, and reviewed the recent developments, which are here described by permission of Mr. T. W. Gibson, Deputy Minister of Mines. For convenience the accompanying sketch map has been prepared to show the geology and the locations of the working properties.

As shown on this sketch, the gold deposits occur along or near the contact between Keewatin rocks and a large mass of Algonian granite and syenite. The Keewatin, which consists largely of basalt and rhyolite with subordinate amounts of felsite, iron formation, slate and conglomerate, has been intruded by numerous dikes of syenite, granite porphyry, feldspar porphyry, quartz porphyry, aplite, pegmatite, diabase and lamprophyre—probably differentiates of the granite. The granite and associated rocks may have been the source of the gold. The deposits are clearly pre-Keweenaw in age. Lying on the granite and greenstones are a few remnants of Animikie sediments (Cobalt series). These sediments and all the older formations have been intruded by numerous narrow dikes and sills of Keweenaw diabase. The silver deposits are Keweenaw or post-Keweenaw in age.

## Gold

**McKellar-Longworth (B. J. 122)**—Four veins carrying visible gold have been located on this property in a large east-west fault zone which has been traced for over 2 miles. The westerly quartz vein is narrow, averaging 8 inches in width; however, it contains a considerable amount of gold and tellurides with some cobaltiferous mispickel, copper and iron pyrites. The vein has been exposed for a depth of 75 feet on a vertical cliff from which 20 tons of high-grade ore have been collected for shipment to a refinery. Farther east on the shear zone a 40-foot shaft has been sunk on a

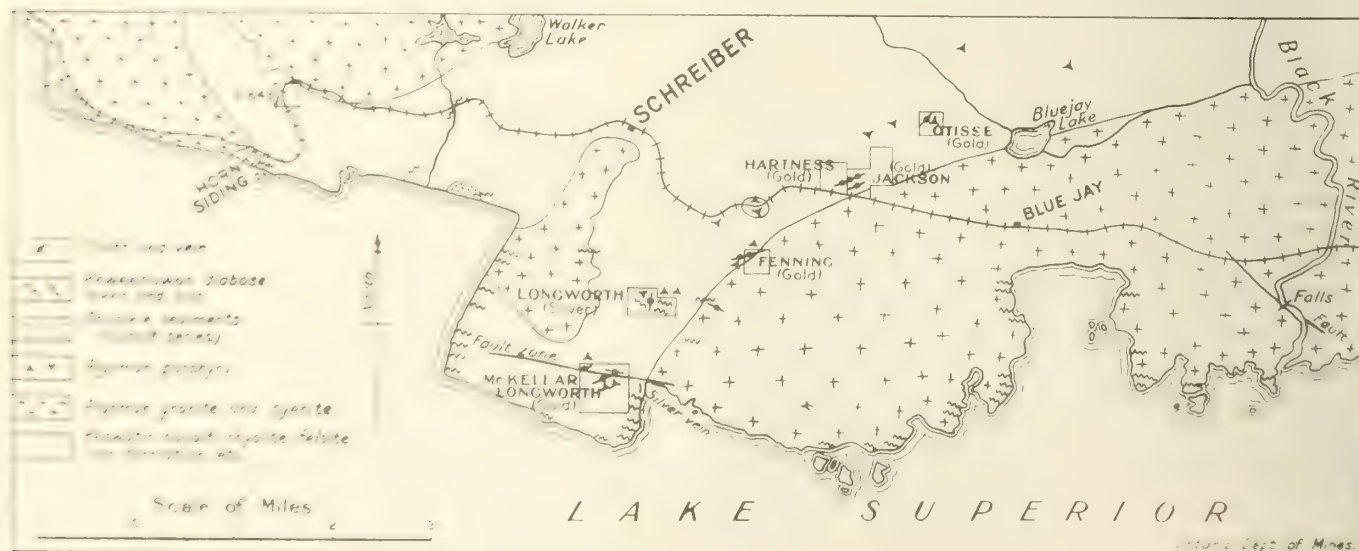
series of parallel auriferous quartz veins, one wall being quartz porphyry. Still farther east a 100-foot tunnel has been driven on a vein from one to five feet in width, the wider portions comprising quartz and schist. The quartz in places averages \$40.00 in gold per ton over a width of 1½ feet.

Messrs. Glendinning and Foster, who have the property under option, are taking out a car of high-grade ore which will be shipped to the Temiskaming Testing Laboratories at Cobalt at the end of this month.

**The Fenning Developing Co.** owns a group of 12 claims about one mile northeast of the McKellar-Longworth. In November, 1922, camps were built and mining commenced on Claim T. B. 3870. A shaft has been sunk 40 feet on a vein lying between a mineralized quartz porphyry and a dark hornblende syenite. The vein is highly fractured and contains a large percentage of chalcopyrite and small quantities of molybdenite, galena and telluride in a quartz gangue. No visible gold was seen but the manager stated that favorable assays in both gold and silver were being obtained.

**The Hartness Claim, T. B. 3354**, is situated on the railway 3 miles east of Schreiber. A few pits have been sunk on narrow parallel lenticular quartz veins, two of which carry high gold contents in places. One ton of ore from a vein 1½ feet wide yielded \$115.90 gold and 3.21 ounces silver. These veins extend easterly unto the **Jackson Gold Mining Co's.** claim, T. B. 3326. During the past year \$20,000. was spent on this property on buildings and prospecting. Two tunnels, 500 feet apart, have been extended into the hill for 50 and 100 feet respectively, exposing two parallel veins on which a few feet of drifting was done. A shaft has also been sunk 15 feet on a gold deposit of the stock-work type, the rock being a comparatively fresh diabase, probably of Algonian age. The diabase for one inch on either side of the veinlets has been metasomatically replaced by carbonate, quartz and pyrite. The **Otisse** claim No. 3412 belongs to the Jackson Mines. Gold is also found in Keewatin rock near the same granite mass 13 miles

\*Volume XXX, Part IV, 1921.



Schreiber Gold and Silver Area, District of Algoma, Ont.





Shaft and Tunnel Workings on the Jackson Gold Mining Co's Property, Schreiber, Ont.

east of Schreiber near Jackfish bay on the *Empress*, *Ursa Major* and other properties.

### Silver

As high as 10 ounces of silver per ton has been obtained from some of the gold veins already described. An important discovery of native silver was made  $1\frac{1}{2}$  miles south of Schreiber in September 1922, on the *Longworth Claim*, T. B. 3850, a re-staked portion of R. 684. The silver occurs in calcite, galena and quartz veinlets in a brecciated zone 2 to 3 feet wide with two well-defined vertical fault walls striking  $20^\circ$  E. of N. An open pit 24 feet long, 15 feet deep and 5 feet wide has exposed two small lenses of 100-ounce silver ore 3 feet long, 5 inches wide and 2 feet deep. The largest

piece of leaf silver was about  $\frac{1}{2}$  inch in diameter. Iron and copper pyrite, chalcocite and probably argentite are also present. The enclosing rock is an altered diabase which has lamprophyre and aplite phases. Time was not taken to determine whether the diabase was a sill or a dike. Under thin section the rock shows intergrowths of quartz and feldspar.

On the shore of Lake Superior one mile south of the Longworth silver vein and in the strike of it is a highly altered Keewatin rhyolite carrying galena and a little silver.

Some small quartz and calcite veinlets carrying galena and zinc blende occur in the Keewatin and the Animikie sediments near Horn Siding, 5 miles west of Schreiber. Two ounces of silver per ton was obtained from a small barite vein carrying fluorite, specular hematite and chalcopyrite at a 90-foot falls on the Black river, 7 miles east of Schreiber.

Argentiferous galens occurs on the C. P. R. 30 miles east of Schreiber on Claims C. 48. The vein is on the west bank of Dead Horse creek and 300 yards north of the railway. An east-west 2-inch vein of galens with some calcite, zinc blende and chalcopyrite has been exposed for 50 feet in diabase. One sample of galena assayed 42.5 ounces silver per ton.

In 1875, Peter McKellar of Fort William worked silver-bearing veins 5 miles to the north west of Middleton station on locations V.49 and V.40 on McKellar creek.

Although no commercial silver deposits have been found as yet in the vicinity of Schreiber, nevertheless there are numerous fractures carrying calcite, galena and other minerals which are worthy of being explored, particularly in the vicinity of Keweenaw diabase dikes or sills. The Silver Islet mine near Port Arthur produced \$3,250,000.00 in silver from the portion of a vein that lay within a diabase dike 300 feet in thickness.

### NEW J.-M. ASBESTOS PLANT

The Canadian Johns-Manville Co., has decided to proceed with the construction of its new manufacturing plant immediately weather conditions permit in the spring. It is still undecided as to where it will be located, and it is therefore not at all certain that it will be near the quarries at Asbestos, Quebec. The first building will be 500 feet by 1000 feet in plan, of concrete and steel and of single-storey daylight construction. The contract for the structural steel work has already been placed with the Dominion Bridge Co. of Montreal.



McKellar Longworth Claim.—Tunnel on East Vein: The quartz in the righthand side is 18 inches wide and carries visible gold.



# Placers at Dease Lake, B.C.

PROMISING GOLD PLACERS NOW BEING  
OPENED UP

By ROBERT DUNN

The Dease Lake country, some two or three hundred miles southeast of Atlin and seventy-five miles or more east of the trading centre at Telegraph Creek, in the northwestern corner of British Columbia, is the greatest placer mining district of British Columbia, according to George Adams, who is engaged there in hydraulic operations.

Mr. Adams is not one whose word should be taken lightly when it comes to placer mining. It has been his business for many years. For fifteen years he was the manager of the McKee Creek Hydraulic Co., Atlin, and prior to that roamed the hills of the north country, a prospector.

On Thibert Creek, one of the waterways draining into Dease Lake, Mr. Adams and associates have taken up a number of placer leases. With the leases they got a hydraulic plant, monitors, flume, tools, cabins, etc., etc. These were taken in or constructed by the late Warburton Pike, the celebrated western big game hunter and miner, and a company of British Columbians. They found gold but their plans had not ripened when war broke out. The call to arms was not to be denied. Tools were dropped, the water turned off, a clean-up worth some thousands of dollars neglected, and the entire camp made for the Coast. There they scattered, all to find their way to the fighting front, whence few returned.

Four years later Mr. Adams "took on" the enterprise. Things were in bad shape. Machinery had rusted and the flume had slipped in different places. He and his men got the camp shaped up, however, in a few months. The forgotten "clean-up" of 1914 was carried on and a few thousand dollars recovered and another pit was opened and some fourteen thousand dollars obtained.

With this evidence of values Mr. Adams decided to open up his ground in a broad way, to sink prospect holes at different points, to repair and enlarge the flume in order that a constant and adequate supply of water might always be available, and generally to lay the foundations for a really big hydraulic mining proposition. This is the work he has been doing for three seasons. His prospecting, he states, has established beyond question that the pay ground persists throughout the several miles of placer he holds under lease. Over a considerable section—if I remember right he mentioned 1,000 feet—it is as rich as it was in the first small pit he cleaned-up two or three years ago.

Two difficulties are being met with, one being the matter of transportation and the other having to do with water. As to the former, no trouble is experienced in getting machinery and general supplies as far as Telegraph Creek. From that point there is a good road for 22 miles to Toya River, but from Toya to the head of Dease Lake, some 50 miles, the route is marked by a trail. Of course, it is fairly open country and the trail, as trails go, is a good one; but Mr. Adams has big things in mind. He wants to take in much machinery to handle his proposition satisfactorily and economically. He therefore is asking the Provincial Department of Mines to assist in the opening up of a

road into the Lake and has been assured that, if his plans are matured as outlined, this will be done.

With regard to water, it is not that there isn't water but that it has been found hard to convey. The old flume has been a constant source of trouble. The bank upon which it is placed is given to sliding and this tendency has frequently interfered with operations. Mr. Adams will take in new plant and will undertake new construction that will remove this handicap and put him in a position to turn seriously to the work of making a few good "clean-ups". As stated at the outset he thinks the Dease Lake country holds mining possibilities very little appreciated by the outside world and that, with a good road, it will not be long before many enterprises similar to his will be successfully launched.

When Mr. Adams talks of the Canadian Northwest, or that part of it in from Telegraph Creek, he waxes enthusiastic not only as to its mineral riches but also in regard to its big game attractions. In the open seasons he and his men live largely on the flesh of moose, bear, caribou, mountain goats and sheep. The country abounds with such game. The moose and caribou are found in herds, the valleys, rich in their wild verdure, affording as pleasant ranges as are to be found anywhere on the American continent. Of the smaller feathered game, also, there is plenty. The "fool hen" Mr. Adams mentions specially. If a covey is treed in the evening on the trail a man may return with his gun at his convenience the next morning and count upon these toothsome birds, of little sense, being found awaiting his pleasure. Thus there is no sport in killing them, but they make a real delicacy for a table surrounded by a body of hungry miners.

The grizzly bear, the King of all Canadian Big Game, also makes his home in the Dease Lake territory. Mr. Adams is a woodsman and a hunter as well as a miner. This, probably, accounts for the wholesome respect with which he refers to the "grizzly." Here is a story, told by him in much the same words he used, which struck me as being much to the point.

"We had some moose meat cached where it had been killed a few months before, about fifteen miles from camp. It was winter and so the meat had frozen and kept its freshness. I and an Indian started out with dog team and sleigh one morning to bring in the meat, intending to lunch at the cache where we had some tea and other supplies. The carcasses had been placed on poles suspended between two trees some eight or nine feet from the ground,—at any rate so high as to be considered safely out of reach of anything that might wander through the forest.

"On reaching the cache the meat was seen to be disturbed. A quantity was lying under the poles. There were tracks in the snow as large in circumference as the average wash basket and the snow was so crushed that it was clear that Bruin had been lying down after enjoying his stolen meal.

"Pete, we're going to load what's left and hike a few miles before eating."



"Aw, what's the matter?" exclaimed the half-breed. "We've got a gun."

"Right you are," said Adams, "but who's going to use it if the bear comes back?"

"I will, if you're afraid," taunted the Indian. "Besides, he's running. Look!" and he pointed to the packs, "the dogs frightened him. He went at a gallop, and when they go that way there is no danger."

"All the same," said the cautious miner, "I didn't come here big-game hunting. I don't aim to enter into single combat with the Goliath of the Grizzly tribe, armed with one medium-weight rifle. So let's wait at it."

And beat it they did.

### THOMAS J. BROWN

Mr. T. J. Brown, who succeeds Mr. Hiram Donkin in the position of Deputy Minister of Mines for Nova Scotia, entered upon his duties during the month of January. Probably no more popular selection could be made either from the standpoint of the province, the coal companies or the miners of Nova Scotia. Mr. Brown is a man of long and varied mining experience, his life having been devoted to the profession of mining, together with steel making, over a period of more than forty years.

He began work in a colliery office as a boy and there learned the business of operating a coal mine. From Inverness he was transferred to Victoria Mines office where he applied himself assiduously to the study of coal mining. After a few years of service he was appointed Manager of this colliery and retained the position until a depression of the coal trade shut down the colliery. He was then given charge of Caledonia (now Dominion No. 4) Colliery. From there he went to the General Office as assistant to Mr. Donkin, who was then General Manager. Being offered a position as General Superintendent at Trenton for the Nova Scotia Steel and Coal Company, he accepted. Here he began his experience in the manufacture of steel. On extending the Scotia steel plant to Sydney Mines, Mr. Brown went back to his old home town, North Sydney, as Resident Superintendent, having charge of both coal and steel operations. He held this position for fifteen years, but relinquished it when appointment was made by the Company of a man with whom Mr. Brown had nothing in common. It was only a short time until Mr. Brown was again in charge as General Superintendent, and there was general rejoicing among the employees.

Mr. Brown took an active interest in the mining legislation of the Province and was a member of a Commission on electricity in the coal mines, which made inquiry into the conditions of Nova Scotia collieries with a view to using electricity as motive power. The results of that work are now being realized and the less dangerous collieries of the Province are being gradually electrified.

Mr. Brown is a member of the Canadian Institute of Mining and Metallurgy, the Mining Society of Nova Scotia and the American Society of Civil Engineers.

One of nature's noblemen, he is the soul of honor and as an employer the "beau ideal" of the working men. With his name are associated all those attributes with which we clothe the employer who is considerate, humane, just and merciful. His is a big, kindly nature, which attracts men and makes friends of them.

The miners of Cape Breton hold Mr. Brown in the highest regard, and he would be a bold workman who even in the time of the acutest labor agitation would dare to utter one word publicly against T. J. Brown, as he is called by his workmen. How much the public of Nova Scotia owe to the tact, the resourcefulness, and the square dealing of Mr. Brown, they will never know. It is the appointment of just such men into executive positions that tends to make the Company or Government they represent popular and respected.



MR. T. J. BROWN

With an expert knowledge of coal mining, gained over a period of forty years, Mr. Brown will fill the position of Deputy Minister of Mines with ability and dignity, and no doubt with success. It goes without saying that the confidence of the miners of Nova Scotia will not only be retained by the Mines Department, but in addition will be further strengthened. Mr. Brown's appointment is cause for congratulation both to himself and to the Government that selected him.

JOHN MOFFATT.

Titanium is present almost universally both in igneous rocks and in the sedimentary rocks derived from them. Of 800 igneous rocks analysed by the U. S. Geological Survey, 784 contained titanium. It is estimated that the crust of the earth contains 0.44 per cent. titanium, or 0.73 per cent. titanium dioxide, this being the ninth element in the scale of abundance.

A serious attempt is being made by the United States Bureau of Mines to evolve a method for reducing the high silica content of the brown iron ore of Birmingham, Alabama, of which a huge tonnage is available.



## LETTERS FROM READERS

To the Editor,

Canadian Mining Journal.

Sir:

I should very soon have assumed responsibility for some little controversies with Professor Haultain. Unfortunately I could not believe that he could or would take seriously a paragraph that was patently playful.

Since Professor Haultain has made a heavy issue of my innocent persiflage, I wish to assume the burden of guilt myself and to express my regret that his feelings were irritated with

The comforting fact is that no one but Professor Haultain could take the matter seriously.

Kingston, Ont.

J. C. Murray

*A Western View of Institute Affairs*

To the Editor,

Canadian Mining Journal.

Sir:

May I venture to make some criticism of your two Editorials in which you refer to the affairs of the Institute in your issues of January 12th. and January 19th. last.

In the first of these comments, under the caption "A Danger Signal," you express the view that the acceptance of gifts of money from corporations is fraught with very grave danger to the Institute. Contrasting this attitude with that which prevailed at the Council meeting held in Vancouver in November last, at which I was present and at which this subject was introduced and discussed under the chairmanship of our President, one does not receive a favorable impression of view-point. It seems in fact, rather jaundiced; and I think it may be conceded that the Institute is above the pretty imputation of being prejudiced by acceptance of tributes that's worth

But, getting down to facts, — such phrases as being "bound hand and foot by fetters" of course sound very alarming, but just what does this mean in this case? What is it that is so threatening to an Institute that has nothing to do with serving any class? In the words of the ancient Jews, "We cannot tell what it is", — and I hardly think that anyone else does either. For even though the motive behind the gift were venal, the Institute's activities could be in no way hampered. For instance, if I were a doctor and a gentleman interested in the undertaking industry came to me and offered me a million dollars in appreciation of my work, I might think him a fool, but I should not feel called upon to impute to him the intention that I should expend the money upon the dissemination of poison germs, neither should I feel called upon to do so, nor to refuse his gift, — certainly not.

In regard to the second Editorial referred to, will you pardon me for saying that it is wrong to state that the proposed amendments to the by-laws, "would exclude all others" than those technically trained or qualified. I need do no more than quote from the amendments;— "Members shall have been in responsible positions with regard to mining or metallurgical work." If this does not clearly and definitely convey, as it was intended to do, the idea of responsibility as being the keynote and the essential requirement, I fear that no words of mine can do so; there is therefore no more to be said upon that score.

Let it be once understood that what we are all interested in is the promotion of the influence of the Institute; let it be understood that influence and responsibility go hand in hand, and I agree with you, Sir, that there is small danger of our Institute failing in its service to Industry. But let there be no mistake, — the conception of responsibility in members must be accepted and provided for, and that is the purpose of the amendments; and as a matter of fact, I do not believe there is already any very great difference of opinion about this.

Vancouver, B. C.

H. G. Nichols.

## NEW EXECUTIVE OF C. I. M. &amp; M.

The following have been nominated for office in the Canadian Institute of Mining and Metallurgy for the coming year, commencing March, 1923. As there has been only one nominee for each position, the election is uncontested.

**For President**

John A. Dresser, Consulting Geologist, Montreal, Que.

**For Vice-President**

Nova Scotia: C. M. Odell, Consulting Engineer, Sydney, N. S.  
Quebec: Thos. Denis, Superintendent of Mines, Bureau of Mines, Quebec, Que.

Ontario: R. L. Peck, Refinery Manager, British America Nickel Corporation, Ltd., Deschenes, Que.

Manitoba: R. C. Wallace, Professor of Geology, Manitoba University, Winnipeg, Man.

Alberta: J. A. Allan, Professor of Geology, University of Alberta, Edmonton, Alta.

British Columbia: Thos. Graham, General Superintendent, Canadian Collieries, (Dunsmuir), Ltd., Cumberland, B. C.

**For Councillors.**

Nova Scotia:

T. J. Brown, Sydney Mines, N. S.  
Geo. D. Macdougall, Trenton, N. S.  
F. W. Gray, Sydney, N. S.  
D. H. Macdougall, Sydney, N. S.  
F. H. Sexton, Halifax, N. S.

Quebec:

N. R. Fisher, Thetford Mines, Que.  
J. J. Penhale, Sherbrooke, Que.  
J. R. Pearson, Asbestos, Que.  
Geo. C. Riley, Dragon, Que.  
J. G. Ross, Montreal, Que.

Ontario:

John McLeish, Ottawa, Ont.  
G. C. Bateman, Cobalt, Ont.  
W. H. Collins, Ottawa, Ont.  
Geo. E. Silvester, Toronto, Ont.  
Geo. H. Gillespie, Madoc, Ont.

Manitoba and Saskatchewan:

T. R. Deacon, Winnipeg, Man.  
B. S. McKenzie, Winnipeg, Man.  
J. A. Campbell, The Pas, Man.  
J. P. Gordon, The Pas, Man.  
R. J. Lee, Estevan, Sask.

Alberta:

A. C. Dunn, Edmonton, Alta.  
John Shanks, Nordegg, Alta.  
J. A. Church, Edmonton, Alta.  
Geo. Kellock, Coleman, Alta.  
W. A. Davidson, Rosedale, Alta.

British Columbia:

M. E. Purcell, Rossland, B. C.  
H. N. Thomson, Vancouver, B. C.  
H. Mortimer-Lamb, Vancouver, B. C.  
Nicholas Thompson, Vancouver, B. C.  
Horace G. Nichols, Vancouver, B. C.  
Bernard Caulfield, Coal Creek, B. C.

The average daily production during 1922 of electric power in the United States for public utility stations was 130,600,000 kilowatt-hours. Of this 36.2 per cent was produced by water power. In Canada less than five per cent of the power from central stations is developed from fuel, the proportion for water power in 1920 being 97 per cent.

# Canadian Oil Shale

## REPORT ON BITUMINOUS SHALES IN NEW BRUNSWICK AND ELSEWHERE

The Geological Survey, Ottawa, has issued recently Memoir 129, *Geology of the Moncton Map-area*, by W. J. Wright. The report of 70 pages is accompanied by a topographical and a geological map of the area on a scale of a mile to the inch and two detail maps of the principal oil shale areas at Albert Mines and Rosevale.

### Geology

This part of New Brunswick has long been known as oil bearing. The "albertite" of Albert Mines was probably the finest fuel that was ever produced. Sporadic attempts have been made to utilize the promising oil shales of the district, and a serious attempt has lately been in progress. The area is highly productive of natural gas. Beds of gypsum give promise of substantial production, and there are some interesting deposits of rock salt.

Dr. Wright's study has been essentially geological, as the Carboniferous rocks of the area have presented numerous unsolved problems. Some of these he has solved, and others remain for future investigations. The oldest rocks of the map-area are pre-Carboniferous possibly as young as Devonian, consisting of much folded and altered igneous and volcanic rocks. At the base of the Carboniferous series, laid down on the eroded surface beneath, is the bituminous Albert series, which contains the beds of rich oil-shale and is the source of the gas and oil in Albert country. This series is 5,000 feet or more in thickness. Above it lie later series of an original thickness of 5000 to 8000 feet, which now provide a large part of the present rock exposures. One of the geological problems is the extent to which the oil-bearing Albert series underlies the folded and tilted rocks of these later series. It is in the Hillsborough series, near the top of the geological scale, that the gypsum beds occur.

### The Oil Shale at Albert Mines

"In Canada, the presence of rich oil-shale in the Maritime Provinces has been known for many years, and considerable money has been spent to determine its value, but no attempt has been made to develop it. The reason for this is apparent. The oil-shale industry is a big manufacturing proposition involving an initial outlay of millions of dollars, large supplies of oil-shale, and careful preliminary experiments by chemical engineers, and the chief product must compete with oil obtained by established companies from flowing wells. At best, the returns are only a reasonable amount on the sums invested. But the oil situation demands new sources of supply. Already reliable companies are looking over the situation and some preliminary experiments have been made. It is hoped that operations will be started shortly, and that the experience and confidence gained from a successful industry in the Maritime Provinces will lead to the establishment of similar industries in other parts of Canada."

Detailed evidence is given as to the quality and quantity of some of the beds of shale, diamond-drill cores as well as rock outcrops being used. The sum

of the evidence available in the Albert Mines area, 20 miles south of Moncton, is as follows:

"Several geologists of note have examined the oil-shale deposits of Albert Mines and estimated the amount of shale and the probable yield of crude oil and ammonium sulphate. The consensus of opinion is briefly as follows: in an area 4,000 to 6,000 feet long and 1,000 to 1,500 feet wide most of the rocks exposed are oil-shale. Furthermore, oil-shale makes the bulk of the rock fragments in the soil. In this area is the gash from which the albertite was removed to a depth of approximately 1,400 feet, and several shafts and tunnels. All of these workings are said to be in oil-shale, and this is supported by the predominance of oil-shale in the dumps from the main and east shafts. The conclusion is that this area is underlain almost entirely by oil-shale to a depth of 1,400 feet. Samples of shale from several points in this area yielded from 32 to 52 imperial gallons of crude oil and 38 to 92 pounds of ammonium sulphate per long ton. On this basis the average yield for the whole body of shale is estimated to be in the vicinity of 40 gallons of oil and 57 pounds of ammonium sulphate per ton. If these conclusions be correct there is here sufficient oil-shale to supply a large oil-shale industry for upwards of 100 years.

"The conclusions mentioned above were supported by the author in 1913, but modified in 1914. Since then it has been found: (1) That the above-mentioned area is underlain by shale which varies from rich oil-shale to barren shale, and some sandstone. The richer the shale, the better it withstands weathering. As a result oil-shale forms most of the outcrops and boulders, whereas the barren shale is not exposed, except in the places where the streams are rapidly removing the soil. (2) Erosion has opened about 791 feet of the measures of which about 50 per cent is exposed, and the remainder covered by soil. The richest known beds (about 3 per cent of the whole) have been analysed and found to be excellent oil-shale. (3) The workings of the albertite vein cut the shales where they are dipping at angles of about 75 degrees and penetrated only about 380 feet of measures. The fact that the shale extends to a depth of 1,400 feet in these workings does not prove the depth of the shale where the measures are lying almost flat, for example along Frederick brook below bed No. 1. In fact it is doubtful if the above workings reached bed No. 1."

The conclusion is, in effect, that there are indications of a very large tonnage of rich oil shale, but that to prove their extent and richness, much more exploration must be done.

### The Rosevale (Baltimore) Area

About the Rosevale, or Baltimore, area, 39 miles southwest of Moncton, there is very little information available. Outcrops show promising oil-bearing beds, but their extent has not been proved. Some diamond drilling has been done, but the results were not available to Dr. Wright. The D'Arcy Exploration Company, a subsidiary of the Anglo-Persian Oil Company, has experimental work under way in this area.



*Other Occurrences*

The concluding pages give a resume of the known occurrences of bituminous shale in Canada. In British Columbia, no workable deposits have yet been found. In the Pasquia hills of Manitoba, oil shale has been located, but analyses indicate a low yield of oil and ammonium sulphate. Bituminous shale is widespread throughout Ontario, but so far as known it is all of low grade. In Quebec, likewise there are large areas of Utton shale, containing small percentages of oil. In the Gaspé peninsula, however, there are beds of shale in the main unexplored, that warrant detailed examination. At numerous places outside the Mone-ton area rocks of the Albert series are reported as oil-bearing.

Nova Scotia has very promising beds of oil shale, particularly in Pictou county near New Glasgow. Mr. Harold C. E. Spence has under way a serious attempt to utilize the shale of this area.

**NEW DEPOSIT OF HIGH-POTASH FELDSPAR**

THE GILSON-CAMPBELL FELDSPAR QUARRY

By A. M. CAMPBELL

During the past four years, the writer has spent much time studying the feldspar situation generally and investigating occurrences of this mineral in Ontario and Quebec. Finally, in December, 1921, his efforts to locate a new deposit of outstanding magnitude and promise were rewarded when his attention was drawn to outcroppings of feldspar on the west half of lot number twenty in the ninth concession of the Township of Bathurst, Lanark County, Ontario. During that winter the top of the ridge was cleared of timber and underbrush, and subsequent work in the form of extensive stripping, test-pitting and other development has tended to prove that the initial sizing-up of the property was correct.

*Description of the Deposit*

This deposit consists of a huge dike of feldspar, 300 feet wide (as shown by openings and strippings), one thousand or so feet long, and with the main mass rising in a rounded knob or hill 40 to 60 feet above the level of the main highway that traverses the property. Regardless of what there may prove to be on the remainder of this one-hundred acre lot, there seems every reason to expect that this hill will eventually produce many hundreds of thousands of tons of a commercial grade of feldspar. For the present we are confining our operations to the eastern end of the ridge, and even that portion of the deposit could, doubtless, furnish enough crude 'spar of the quality required for the ceramic industry to satisfy the requirements of American importers for many years. In fact, an inspection of it has satisfied the representatives of several American grinding companies that at last a deposit of high-potash feldspar has been found of sufficient size and purity to provide a large and reliable source of supply of uniform quality.

The orebody forms part of a coarse-grained pegmatite intrusion that can be traced across this part of Bathurst township for a mile or two. In this portion of it, crystallization has taken place so as to separate large masses of feldspar. As usual, the dike does not consist wholly of good material, but includes segregations of

feldspar crystals. This coarse crystallization usually occurs in the larger dikes when they cut hard rocks, such as granites and gneisses, as this one does. The spar here is of the orthoclase variety and ranges in colour from white, through pink, to red. While we are at present mining pink and flesh-red 'spar, we recently uncovered, in a near-by portion of the dike a pure white potash 'spar similar to the highest grade ore coming from the Buckingham, Quebec, deposits.

*Quality*

Regarding impurities, I might say that there appears to be less quartz than usually occurs in such dikes. So far, no mica has been encountered in our workings, and the amount of other accessory impurities, such as tourmaline, pyroxene and iron pyrites, is, on the whole, negligible. In several places on the dike there is a graphic intergrowth of quartz, but its quantity per cent. is not sufficient to affect appreciably the quality of the 'spar. In our principal opening we encountered a zone of oxidation, with its accompanying discoloration, which extended for some distance in depth, but we have now gone below this, into clean 'spar.

The analysis of a representative sample of our ore, made at the laboratory of the Mines Branch, Department of Mines, Ottawa, gave the following results:—

|                              |        |
|------------------------------|--------|
| Silica . . . . .             | 65.10% |
| Ferric oxide . . . . .       | trace  |
| Ferrous oxide . . . . .      | 0.11   |
| Alumina . . . . .            | 21.50  |
| Lime . . . . .               | 0.11   |
| Magnesia . . . . .           | 0.06   |
| Oxide of potassium . . . . . | 12.81  |
| Oxide of sodium . . . . .    | 0.58   |
|                              | <hr/>  |
|                              | 100.27 |

A previous analysis gave Silica, 65.01 per cent., Alumina 19.82 per cent., Potash 12.61. per cent., etc., while others gave 11.66 per cent. and 12.89 per cent. of Potash.

*Transportation*

The 'spar is hauled by wagon or sleigh about five miles to the Canadian Pacific Railway station at Glen Tay (4 miles west of Perth, Ontario) over a comparatively level and good road which runs through the property. To connect the hill top working with the main highway, about 200 yards of new road had to be built.

While our operations have been somewhat delayed from various causes, a fair amount of ore has been shipped and the property is now equipped to provide for a larger production. Enough development has taken place to satisfy not only the owners, but also certain users that this deposit is capable of the consistent shipment of large amounts of merchantable feldspar annually. Large users of 'spar realize what it means to be certain of getting all the ore they require from a single quarry, thus securing a uniformity of grade not otherwise obtainable.

The new smelting plant of the Cerro de Pasco Copper Corporation in Peru, began to operate this month. For the past three years it has been under construction. Its capacity is 1500 tons a day of ore.

# Oil Engines for Mines

FAIRBANKS-MORSE "Y" TYPE FROM  
10 to 300 H. P.

The advantages of oil-driven engines for motive power and the production of electricity under certain circumstances in Canadian mining camps is becoming increasingly apparent. As the fuel has to be imported and in some cases transported for long distances, the oil engine is by no means the ideal source of power, but where no hydro-electric power is available, or where there must be auxiliary power as a stand-by or to supplement hydro-electric power, an oil engine installation is hard to beat. Of course, where coal is abundant and cheap, a steam plant is the logical solution of the power problem; but in areas like northern Ontario and Quebec, the oil engine is coming into use at a rapidly increasing rate.

Before an ore-deposit is proved, that is before it actually becomes a mine, circumstances seldom warrant the expense of a hydro-electric power development or a long transmission line; yet power is needed in considerable quantities to run the compressor, hoist and pumps. The

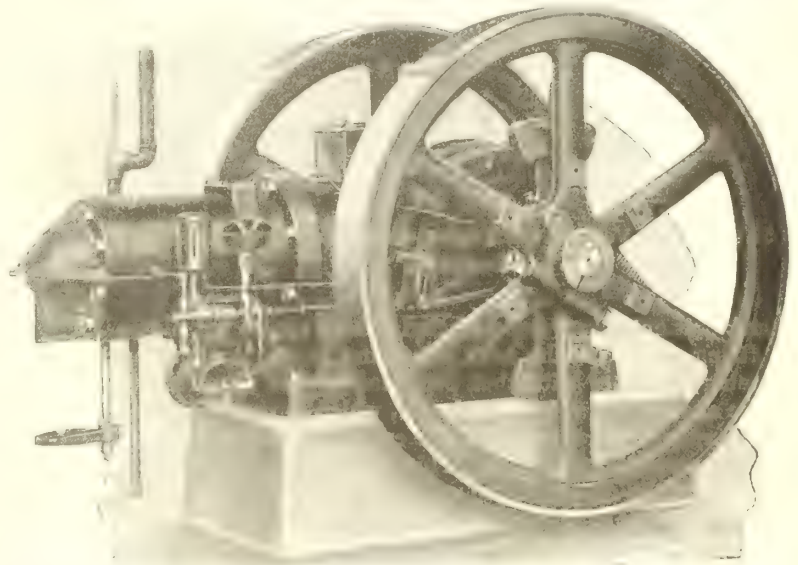
In practically all sections, however, the price of gasoline is much above that of other products of crude petroleum, and in many places this advance in price has been shared by kerosene, so there is a real need for engines that will operate on much lower grades of oil such as the heavy Solar oils, gas oils and fuel oils, or even the crude oils as they come from the wells. In each locality there will be some of these fuels that may be obtained at less cost than the others, and the ideal engine is the one that will handle all practical fuels without change and at the same time economically.

To meet this need of a reliable and economical oil engine, free from complications, a line of engines known as the "Y" type has been developed by Fairbanks-Morse and Company, ranging in sizes of 10 to 25 horse-power in the horizontal type and from 37 1-2 to 300 horse-power in the vertical type. They embody the results of years of experience with internal combustion engines of all kinds,

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Fairbanks-Morse "Y" Horizontal Oil Engine.  
made in sizes 10 H. P. to 25 H. P.

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wood fuel within reach is seldom adequate for more than the initial development, when a tiny steam hoist and a steam drill are used for the prospect shaft. The power problem is one of the most pressing considerations as soon as the property passes the stage of a mere prospect.

## *Adaptable to a Wide Range of Fuel Oils*

The internal combustion engine has come into such universal use during recent years that the technical public no longer requires special proof its economy and reliability.

Undoubtedly the greatest single step since internal combustion engines were first produced, was the use of liquid fuel directly in the cylinder of the engine. The results of that invention have been of world-wide importance. It made possible the development of all modern gasoline engines, such as are used in automobiles, trucks, airplanes, tractors, high-speed power boats, and in practically every other important industrial application.

The situation in the production, refining and cost of crude petroleum has been changing very rapidly in the last few years. Conditions even now are not the same in any two large commercial centres, so the question as to which of the various liquid fuels is best is still a local one.

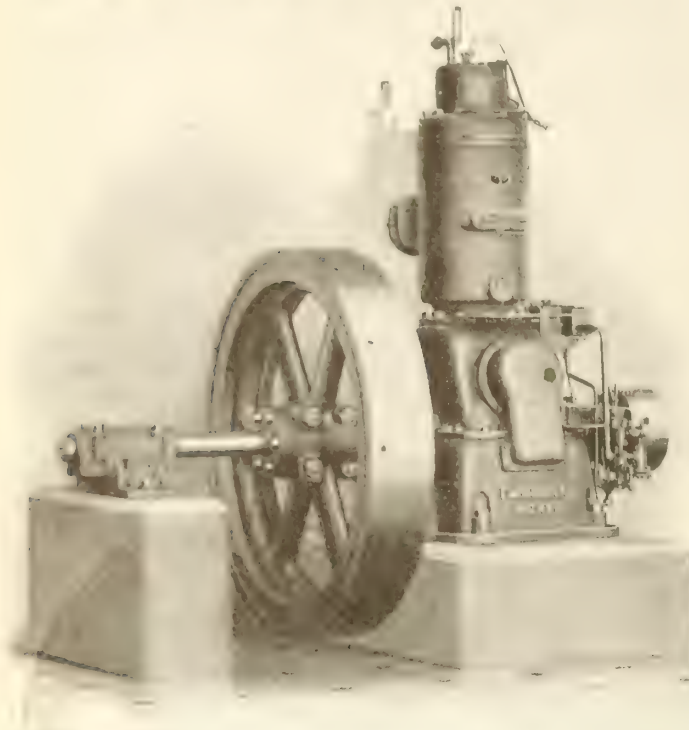
coupled with careful study and investigation of oils and oil engines at home and abroad, together with extensive experimental work covering long periods. They are adapted to any stationary power purpose within their range of capacity. They can be belted to line shafts to drive mining machinery, etc., or may be belted direct to an air compressor, pumps, electric generator, etc. For the generation of electric power these "Y" engines can also be direct connected to a generator. In any case they are equipped with fly-wheel of sufficient weight to prevent pulsations or flicker in the electric lights from the generators, and they may be arranged for parallel operation of two or more similar units on the switchboard. The company are prepared to guarantee successful parallel operation with 60-cycle alternating current generators direct-connected to any of the vertical "Y" Engines of one or more cylinders. This indicates the closeness of governor and flywheel regulation attained with these engines, as it is well known that there is no more exacting service than that just referred to.

These engines have also been used successfully at mines for hoisting. This is an exacting requirement, and demonstrates the degree of reliability to which the present-day oil engine has attained.



*General Principle of Operation*

The "Y" engine operates on the two stroke, moderate pressure principle, with the fuel injected into the combustion chamber by means of a simple pump, properly timed, and controlled by the governor in proportion to the load on the engine. It is not a hot bulb engine, as the combustion



50 H. P. "Y" Vertical Oil Engine for Belting to an Electric Generator

chamber is entirely water-jacketed. There are no hot plates or firing pins, but the heat remaining in the combustion chamber, together with that produced by the compression of the charge of air, ignites the oil, which burns with more of an expansive pressure than the explosion of the ordinary internal combustion engine. This system of combustion is a development accomplished only by painstaking work on a great variety of designs, each of which was completely tested and tried out in many modifications, and represents the highest development in simplicity, economical operation and reliability obtained in oil engines to date.

*Features of "Y" Engines*

As they use the solid injection principle, these engines do not require two or three-stage high-pressure air compressors, which are always an expensive auxiliary to maintain, and which absorb from 10 per cent to 15 per cent of the total power generated.

There is an absence of all inlet and exhaust valves, which reduces the care in maintenance and the expensive renewals of such parts.

Owing to the lower working pressure and temperature of the "Y," it costs materially less for the maintenance of its mechanical parts, which are few in number and of rugged simplicity in design.

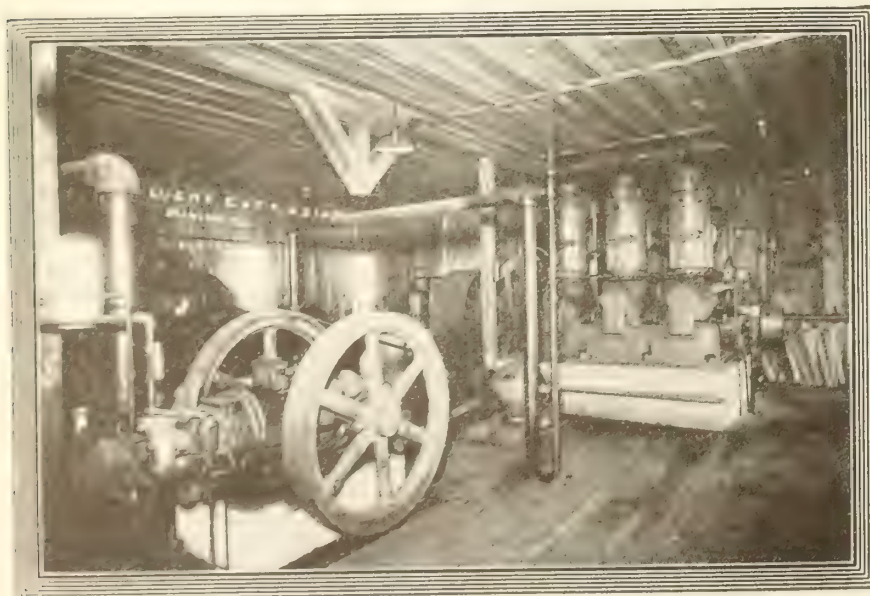
Coupled with these points of economy in its mechanical features, the simplicity of the "Y" engine makes a highly skilled engineer unnecessary. An attendant with a short experience in operation machinery, after a brief course of observation and instruction by the installing engineer, can operate it with entire success.

References to the test records and the guarantees on fuel consumption show the advantages of the "Y" engine in economy of fuel.

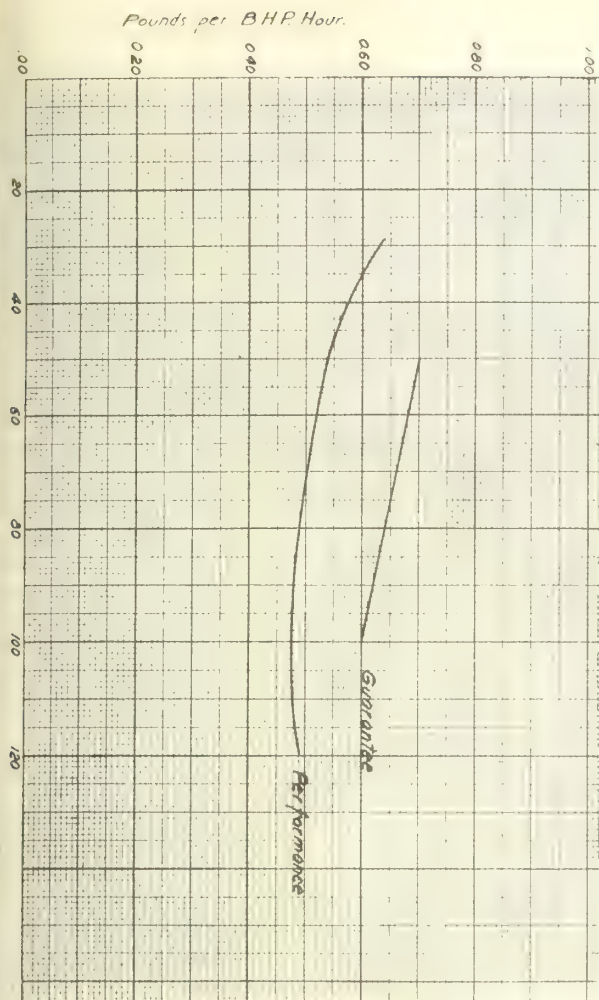
*Fuel Oil Specifications*

As indicated above "Y" engines operate with satisfaction on the lower grades of oil, such as the heavy Solar oils, gas oils and fuel oils, or even crude oils as they come from the wells. From the very nature of petroleum, whether in the crude or partially refined condition, its composition is very complex, and fuel oils really consist of mechanical mixtures of a great variety of distillates and residues, in proportions that are scarcely twice the same. Many scientific attempts have been made to prepare specifications under which oils might be purchased so as to eliminate all that might be unsatisfactory for engine use and yet exclude none that could possibly be used. So far these attempts have not been truly successful, and the final test of the value of a fuel oil is its operation in an engine. The amount and nature of the residual content in an oil is not a measure of its value as an engine fuel, as it must always be considered in relation to the proportion of lighter or more volatile components that will help to "carry" or thin the heavier portions.

Generally speaking, fuel oils offered by responsible oil companies under certain brands or descriptions are reasonably uniform, and a complete examination of a suf-



20 H. P. "Y" Furnishing Light for a Lead and Zinc Mine. Note also the 150 H. P. "Y" Vertical Engine in the background



Performance Tests

ficiently large sample of the oil in question will indicate whether or not it would be an economical fuel. The manufacturers of this engine have made complete physical, chemical and distillation tests of oils for many years, and the results of these tests are at the disposal of their customers. They also stand ready to assist operators of "Y" engines at any time by making complete examinations and reports on fuel oils that may be offered for their consideration, without charge.

This appears to be a much more rational way of coping with the constant changes in the character of fuel oil than an attempt to regulate the supply of oil by means of specifications. Time and trial have shown that this is the better way.

#### Tests And Guaranties

Each "Y" engine at the factory is given a thorough test at partial load, full load and over-load, and the results

are recorded for future reference. The object of this test is to ascertain that the engine is in perfect mechanical working order, or to correct any points that need it, and to make sure that it operates well within the standard guaranty of fuel consumption. In this particular it is preferable to maintain a conservative policy, and not to rate the engines either in their horsepower output or in their fuel consumption dangerously near to the best they can do. The margin allowed on these points is for the greater satisfaction of the users and insures against disappointment.

The standard guaranty is that the "Y" engine will develop its full rated brake horsepower at sea level on a consumption of 0.60 pounds of approved fuel oil per brake load. By "approval fuel oil" is meant one that is included in the maker's list of such fuels or that may be approved after being tested. The relation between the fuel consumption guaranty, as just stated, and actual results from the regular factory tests is shown by the curves on the accompanying cut. It will be noted that the actual fuel consumption of the engine is much less than the guaranty.

#### Fuel Cost

The fuel recommended for type "Y" engine in Canada is easily obtainable from the several leading Canadian oil companies. This fuel has a gravity test of 31 deg. to 35 deg. Baumé, weighing between 8.67 and 8.47 lbs. per imperial gallon. Translating the figures on the chart from pounds to liquid measure, the fuel consumption would be 0.085 imperial gallons per brake horsepower hour at full load, 0.092 imperial gallons at three-quarter load and 0.099 imperial gallons at half load. Taking the laid-down cost of the fuel at 15 cents per gallon the fuel operating cost would be approximately one and one-quarter cents per brake horsepower hour at full load.

### THE EMPIRE'S GOLD PRODUCTION

The following table, prepared by Mr. Joseph Kitchen and published by Samuel Montagu & Co., London, indicates the place of the British Empire and of Canada in the world's production of gold. Mr. Kitchen says: "Canada is the only country to show a marked improvement [in gold production] and it now ranks as second producer in the British Empire and third in the world."

"1922 will probably have seen the end of the decline in total output that has been proceeding since 1915, the year of high-water mark, and 1923 is likely to show a notable improvement, which may reach £10,000,000 or £11,000,000. This will be mainly due to the Transvaal, which for the last six months of 1922 produced £19,400,000 as compared with £17,700,000 for the corresponding period of 1921."

|                             | 1922 est.          | 1921               | 1920               | 1919               |
|-----------------------------|--------------------|--------------------|--------------------|--------------------|
| Transvaal .....             | £29,800,000        | £34,500,000        | £34,700,000        | £35,400,000        |
| Canada .....                | 5,300,000          | 3,800,000          | 3,300,000          | 3,300,000          |
| Australasia .....           | 3,500,000          | 4,000,000          | 4,900,000          | 5,400,000          |
| Rhodesia .....              | 2,800,000          | 2,500,000          | 2,300,000          | 2,500,000          |
| India .....                 | 1,800,000          | 1,700,000          | 1,900,000          | 2,200,000          |
| West Africa .....           | 800,000            | 900,000            | 900,000            | 1,200,000          |
| <b>Total .....</b>          | <b>£44,000,000</b> | <b>£47,400,000</b> | <b>£48,000,000</b> | <b>£50,000,000</b> |
| Approximate World's Total   | £65,000,000        | £68,000,000        | £69,000,000        | £75,200,000        |
| British percentage of Total | 67.7               | 69.7               | 69.6               | 66.5               |



## MINERAL RESOURCES OF VANCOUVER ISLAND

The following memorandum on the known mineral resources of Vancouver Island and vicinity was presented to Sir Henry Thornton, president of the Canadian National Railways, on his visit to Victoria recently, and is reprinted from the "Daily Colonist":

Vancouver Island, with an area of 16,000 square miles, has coal measures covering some 2,000 square miles. It occupies an exceptional position in this connection, as it possesses the only high grade bituminous coalfields north of Peru, thereby controlling some 5,000 miles of the Pacific coast, with the exception of the State of Washington, where the coal is of low grade, being a semi-lignite.

Official tests of the United States Navy show that it takes 112 tons of Vancouver Island coal or 145 tons of Washington coal to produce the same heat unit as 100 tons of the highest grade Welsh or Pocahontas steam coal.

Only such seams as it has been necessary to develop to take care of the present market have as yet been opened, but there is enough coal blocked out to provide for the present rate of requirements for the next 50 to 100 years. Vancouver Island produces 75 per cent of the coal tonnage of British Columbia. The output of the Island mines varies from 1,500,000 to 2,000,000 tons annually. The present cost at the mines averages \$6.75 per ton. If the market could be developed to the point of enabling the mines to operate at capacity, it would materially reduce the price by reason of the reduction in overhead and furnish additional employment that would add many thousands to our population.

### Iron Ore

Vancouver Island occupies the same advantageous position in relation to the North Pacific coast on iron ore deposits as it does on coal. It is a fact that there are no good iron ores on the Pacific coast south of British Columbia.

The commercial iron ore bodies of Vancouver Island probably approach in size that of all the other iron ore resources in British Columbia which are near enough to the coast to be of immediate importance—(Whittier).

The best known sources of iron ore are on Texada Island, immediately adjacent to Vancouver Island. The United States battleship Nebraska, constructed at Seattle, was partly manufactured from Irondale Pig, made from Texada Island ore.

Hayes estimates the iron ore deposits of Texada Island of commercial grade as approximately thirty million tons. Wilmott estimates that on the Godman properties at Gordon River, there are available fifteen million tons, including the ore on the Bentley group.

Brewer estimates the deposits at Upper Quinsam Lake of magnetite ore as five million tons.

The Western Steel Corporation's holdings of bog ore situated at Quatsino Sound, contain approximately ten million tons. There are large deposits which have not been measured on Buggaboo Creek, the Sooke District, at Sarita River, and along the Alberni Canal, Nootka Sound, Klaaneh River, Klinak Lina River and Upper Campbell Lake, many of which give indications of still greater volume than those mentioned as having been more accurately measured.

There was produced in the Victoria district last year over one million dollars in miscellaneous non-metal-

liferous deposits, including lime and limestone, tale pottery clay, firebrick, cement, etc.

### Gold and Copper

The Island is rich in metalliferous deposits. Gold is found in the black sands at different points and the sand and gravel of the Leech and other rivers is gold-bearing.

The gold and copper deposits of Vancouver Island are varied in extent and indicate large future development. The Sunloch Mines, situated at Jordan River, 45 miles from Victoria, consisting of some thirty claims, have been purchased by the Consolidated Mining Company, of Trail. The property is situated close to tide-water and the company purposes, and has in view, the erection of a large concentrating plant at that point. The copper-bearing rock is not in vein formation, but the entire claims are copper-bearing throughout their length and breadth, averaging for the entire property two per cent copper, representing an enormous quarrying proposition offering probably the most economical cost of production in the Province. This property has been reported upon by eminent mining engineers as one of the largest copper deposits in Canada, the permanent nature of which has, we think, been proved by development work.

### To Build New Smelter

The same company owns the Coast Copper Company's property at Quatsino, where the ore-bodies are of sufficiently high grade and have been proved to an extent that has warranted the decision to erect a concentrator at that point in the early future. The report of the Government Minister of Mines for 1921 states that it is the intention of this company to build a copper smelting plant on the Island as soon as costs of construction and development work at their mines reach a satisfactory point.

The Tidewater Copper Company owns a valuable property at Sidney Inlet, the ore running from \$15.00 to \$20.00 per ton in gold and copper values. The mine operates a concentrator with a capacity of 200 tons per day, and sufficient ore is already blocked out to keep the mill running for many years. It has several thousand feet of underground workings and over 10,000 feet of diamond drilling, which has proved the depth and value of the vein.

Much more may be said, but we hope that the foregoing will convey to you in some small measure the immense possibilities that are lying dormant immediately adjacent to this port, which is Canada's gateway to the Pacific.

We ask you to consider these data in conjunction with the review made by Mr. Cameron on our timber and lumber resources, and we would add in addition that we have an almost unlimited supply of water power available for development. All these resources are immediately contiguous to one another. They form a set of factors which are bound to lead to a vast manufacturing development on this Island at a cost which should enable it to enter into world competition for foreign markets.

### Vancouver Island an Industrial Centre of the Future

The large manufacturing centres of England have to seek their outlet for foreign trade through the ports of London and Liverpool at a cost to seaport of \$3.00 to \$4.00 per ton.

Pittsburg has to seek its outlet via New York at a cost of \$4.00 to \$7.00 per ton, and the same thing per-



tains to the manufacturing cities of Germany. We have no such handicap, being situated immediately on the ocean.

The big commercial development of the future undoubtedly lies in the Orient. With sparsely inhabited Australia, the teeming millions of China, India, Siberia, and other countries, groping towards an Occidental civilization with all it implies in its vast consumption of manufactured material there is no country in the world so favorably situated in shipping transportation to these great potential markets as Vancouver Island.

Surely this wonderful combination of factors, the gift of Nature, and our geographical situation, form a combination which should result in a future development almost beyond our present power to comprehend.

The Canadian National Railway can, by its activities, assist in a great measure towards this end, and by so doing reap the major share of the benefits to accrue therefrom from a transportation point of view.

## Book Reviews

**THE RESCUE MAN'S MANUAL** — compiled by Arthur B. Clifford, M.S.M. — The Colliery Guardian Co., 30 Fumival Street, Holborn, London E. C. 4., England. — 46 pages — 1 shilling; by post 1s. 2d.

This little book is a convenient guide for those engaged in rescue work at collieries. It is couched in single language and is intended to supplement the work of a skilled instructor. It deals specially with conditions in Great Britain, but is applicable wherever breathing appliances are employed. It gives brief descriptions of all the appliances so far approved by the British Mines Department. Its low price puts the manual within reach of every man interested in mine rescue work.

**A PROGRESSIVE COURSE OF COMPARATIVE GEOGRAPHY** — By P. H. L'Estrange. — (new edition, revised and enlarged, 1922) — George Philip & Son, 32 Fleet Street, London E. C. M., and Renouf Publishing Co., 25 McGill College Ave., Montreal. — 168 pages and 75 maps. Fully illustrated — Price \$5.00.

The modern study of geography is not what it used to be — it is now rational, interesting and instructive. Since the good old days of twenty or thirty years ago a reform has been instituted, and one of the principal reformers is Mr. L'Estrange. No longer can the pupil memorize a list and then lead the class. He must now use all his faculties. Most remarkable of all, the study of nature, which comprises the bulk of the physical features of this globe, and of human nature, which has accounted for the rest, are now conceded their true value in primary and secondary education. Particularly striking is the concession that the elements of geology, without which no one can understand this world of ours, and a general estimate of our mineral industries, upon which civilization is built, are proper subjects of study for the children of the British lands.

This is a most admirable book, and should be in many Canadian homes, for the instruction of parents more than for the children. It is devised, of course, for school-room use, and is specially suited for that purpose. But for a general, well-balanced and suggestive survey of our globe, it will be hard to beat.

Mr. L'Estrange's firm grasp of his subject is well illustrated by some sentences in his preface. "Learners

must be induced to reason not to memorize, ... 'Human Geography' treats of the influence of environment on man's progress and of human ingenuity on environment, and is the only geography worth teaching as education ... An intelligent research into the past will enable us to understand the present and know how to work for the future ... No one can fully know how to live unless he understands the region in which he lives and the previous efforts of man to live in that region. ... The learner, starting with well-known everyday phenomena around him, is led to deduce from these some guiding principle, in accordance with the theories of the best physical geographers ... If it is known where a country is on the globe and how its mountains and plains are arranged, its temperature at various seasons, its winds and rainfall can usually be deduced. From these follow its natural vegetation and products, and the pursuit of its human inhabitants and their distribution."

With this we must leave Mr. L'Estrange to develop his subject in a book that has already marked an epoch in the study of geography.

### SILVER PRODUCTION IN 1922

In commenting on the world's silver production in their Annual Bullion Letter for 1922, Samuel Montagu & Co., London, remark that "Canada is producing nearly half as much again as last year, and encouraging reports are received as to the discovery of new mine fields." Their estimate of the 1922 production of silver is as follows:

|                        |            |
|------------------------|------------|
| Mexico .. . . .        | 75,000,000 |
| U. S. A. .. . . .      | 60,000,000 |
| Canada .. . . .        | 17,000,000 |
| Burma .. . . .         | 5,000,000  |
| Rest of World .. . . . | 30,000,000 |

Total .. . . . 187,000,000

E. Cecil Short & Co., of Montreal, Canadian agents for Wm. Benson & Son, Ltd., Newcastle-on-Tyne, have for distribution a catalogue describing "Benson" firebricks.

The Hardinge Company, New York, have issued a new catalogue (No. 13, January, 1923), which gives a general description of their conical ball and pebble mills and their use, and details about the standard sizes and varieties. The crushing action of the mill is clearly set forth, and facts are cited to show that the natural classification of balls or pebbles in the mill according to their sizes actually takes place, this contention having been controverted by the proponents of cylindrical mills.

There has been incorporated recently a new company, Webster-Inglis Limited, for the manufacture in Canada of the conveying, elevating and power transmission machinery of the well-known Webster Manufacturing Co. of Tiffin, Ohio, and Chicago. The new company is a subsidiary of the John Inglis Company, Toronto, and will make use of the Inglis shops. Mr. Wm. Inglis is President, and Mr. A. T. Perkins, Vice-president. Mr. Perkins is President of the Webster Company.

Of thirty-nine producing gold companies on the Rand, only three failed to show increased returns during the month of October last.



# The Mining Districts

BY THE JOURNAL'S CORRESPONDENTS

## NORTHERN ONTARIO

**POWER FOR HOLLINGER.** Confirmation of the acquisition of power rights on the Abitibi River by the Hollinger is reported to have come from the Government officials in Toronto. Details have not been given out, as it is understood that some of the terms have not been finally decided upon. Negotiations have been under way for some time, but there were a large number of points to be taken into consideration, particularly as the Abitibi Lake, from which the river flows to James Bay, is partly the province of Quebec. The Abitibi Paper and Power Company had also to be satisfied, and on account of its extensive development of the River it claimed to have prior rights. The site for the power development is stated to be at Island Falls, which is about 75 miles in a direct line from the Hollinger Mine. Officials of the Hollinger have previously stated that no action regarding dividends would be taken until the power question was settled, and if a lease has actually been obtained, it is now anticipated that some action on dividends will be taken at the annual meeting in March. The appeal of the Hollinger in respect to the \$2,000,000 suit against the Northern Canada Power Company was heard this week, but judgment was reserved. It is also understood that the Power company will bring a suit against the Hollinger to have the company sign for its entire power requirements. If the Power company is successful in this suit, it will prevent the Hollinger from developing its own power. Officials of the company, however, appear to be confident enough to go ahead with the proposals. It is understood that a new company will be formed to finance the power scheme, and that money will be raised by the sale of bonds to the Hollinger shareholders.

**GREAT NORTHERN POWER.**— Approximately five hundred men are at work on the power plant and transmission line of the Great Northern Power Company, which will endeavor to have power into the Porcupine camp some time this coming spring. The concrete work at the power house is practically completed, and the machinery for the first unit of 2150 h.p. is being installed. Fifteen miles of the transmission line to Porcupine has already been cleared, and camps are being constructed along the route so that work can be carried on from a number of points.

**PORCUPINE.**— The Porcupine Crown property in Porcupine has been closed, and it is understood that no further work will be done until some definite arrangements are arrived at regarding the dissolution of the North Crown Mine. The Thompson Krist has not been able to raise enough money to pay off its share of North Crown expenditures, and redeem its property, and it is understood that this will have to be done before the Porcupine Crown can resume.

The Coniagas has completed the unwatering of the Newray mine, which it has under option, and is now making an examination of the underground workings.

**KIRKLAND.**— At a recent meeting of the Kirkland Lake Proprietary, held in London, the chairman announced the sale of the company's interest in the Sylvanite property. He also stated that it had been found advisable to close down the mill as on account of the

small amount of development work, there was not sufficient ore in sight. The company proposes, however, to supply additional money up to a total of \$250,000, which is considered to be more than sufficient to place the company on a dividend paying basis. The terms of the deal for the Sylvanite were not announced, but it is understood that the figure is approximately \$600,000, which is to be paid within two months. The chairman stated that the company was to receive more than sufficient to pay off the indebtedness, which amounted to £120,000.

The shaft of the Sylvanite is down over 600 feet, and will be continued to a greater depth and a comprehensive scheme of development undertaken.

The Tech-Hughes shareholders have ratified the by-laws authorizing the company to purchase all the stock of the Orr Gold Mines. As about \$275,000 cash will be required, it is understood that the company will have to borrow some money to complete the deal. Substantial profits are, however, being made, and the company should soon be in a good position again shortly. It was also stated at the meeting that the company still had \$325,000 in bonds outstanding, and if these bonds are paid off before dividends are started, it will probably be some considerable time before any disbursements are made to shareholders.

The main shaft of the Wright-Hargreaves is down to 900 feet and will be continued to 1000 feet, where a new level will be opened up. In the veins hold their size and values at this depth it is anticipated that the mill will be enlarged some time during the present year.

**LARDER LAKE.**— During the past year the Crown Reserve made a little profit from sorting high-grade silver ore from the surface dumps at Cobalt. At the Pancake Lake Gold property the shaft is being sunk to the 500-foot level. On the 300-foot level two veins were drifted on for considerable distances, and each vein showed an ore-shoot 125 feet long, averaging about \$7.00 over a width of 15 feet. In order to finance further work on the Pancake Lake property, it will be necessary to increase the capital of the Crown Reserve.

**COBALT.**— During the month of January La Rose sank and timbered 155' 2" in the new Violet Shaft. This constitutes a new shaft-sinking record for Ontario, if not for Canada. The footage made is particularly good as during the first half of the month hoisting was done with a derrick using seven and one-half cubic foot buckets. The shaft is two-compartment and measures 11' 4" by 6' 4" outside the timber; but there was considerable over break. The rock is hard diabase but drills and breaks well. Three shifts of seven men each were used underground, but no the mucking shifts one man stayed on top to help the lander. A separate timber crew of four men does the timbering while the round is being drilled and the timber is kept within about 30 feet of the bottom. Four machines on bars were used and 18 to 22 holes were used to pull a round. An account of the short length of the shaft a 7½-foot cut hole was the deepest that could be drilled and a round averaged about 5' 9". The shaft was down 240 feet at the end of January and will probably be continued to a depth of over 600 feet.



## BRITISH COLUMBIA

**NEW CONCENTRATOR AT ANYOX.**—The Granby Consolidated Mining & Smelting Co., having practically completed a large capacity reservoir, thus assuring a constant and adequate water supply, is reported to be preparing for the construction at Anyox, B. C., of a large concentrator. A considerable quantity of the ore of the company's Anyox mines must be put through a mill and it is understood that other prospects are under development the ores of which will have to be similarly treated. The site of the additional plant will be on the railway between the mine and the smelter and it will be ready for use early next year.

**GRANBY AND CANADA COPPER.**—A report from Spokane Wn. has been received to the effect that the Granby Consolidated Mining Smelting & Power Co. contemplates increasing its capitalization from 250,000 to 500,000 shares, with a view to the purchase of the property of the Canada Copper Corporation, situated on Copper Mountain near Princeton B. C. It is said that the proposition will be voted on by stockholders at a meeting to be held at New York on February 8th. Unofficially it is affirmed that the Company has in view the expenditure of several million dollars but no definite information is given as to whether this is to be invested in betterments at Anyox and at the Cassidy Collieries, Vancouver Island, or whether the construction of a smelter near the Copper Mountain Mine is proposed.

The statement referred to, which is given on the authority of J. T. Crabbs, executive vice-president of the Granby Company, follows: "The Canada Copper is in process of re-organization. A new company is to be formed to acquire all of its properties and assets free of liabilities, and in addition it will have \$800,000 in the treasury.

"The properties are fully equipped. Engineers have estimated that they contain more than 10,000,000 tons of developed ore averaging 1.74 per cent. copper. A recent review of diamond drill and development records and an examination of the workings by our own engineers and geologist conservatively concede 5,635,980 tons of 1.83 per cent. ore, with values in gold and silver and probable increased tonnage as developments proceed.

"While the Canada Copper concentrating mill is up-to-date, additions will be necessary to insure a rated capacity of 2000 tons a day. The cash fund of \$800,000 is believed to be ample for the purpose and to supply sufficient working capital pending the receipt of income from operations. Satisfactory arrangements for transportation, power and treatment of concentrates have been made.

"Those entitled to a majority of the stock of the new company have signified to your directors their willingness to exchange such stock for Granby stock on a basis of 155,000 shares of Granby stock for 100 per cent. of the capital stock of the new company. The exchange is not contemplated unless 85 per cent. of the stock of the new company is acquired by Granby.

"Granby has 189,994 shares outstanding and the 60,006 shares remaining are required for the conversion of outstanding first mortgage bonds and debentures. The addition of 250,000 shares will leave 95,000 available for general purposes after acquisition of control in the Canada Copper. An issue for the 95,000 shares is not contemplated at present."

At the New York stock exchange valuation on Granby shares, which is upward of \$24 a share, Granby would pay \$3,750,000 for the Canada Copper.

**GRANBY WINS SUIT.**—The Privy Council has given judgment in favor of the Granby Consolidated Mining & Smelting Co. as against the Province of British Columbia, the amount at issue being \$63,000 which the Company claimed, should have been allowed under regulations allowing a discount of ten per cent. providing certain conditions are met in connection with payment. It was the contention of the Province that these conditions had not been complied with. This the Company combatted, asserting that the 1921 taxes were paid within the time limit set. In the Supreme Court the Company was successful but the Appeal Court of British Columbia upset the judgment of the lower court unanimously. The Privy Council, to which appeal was taken, not only upholds the lower judge but declares that all costs of litigation must be met by British Columbia. This is likely to add materially to the sum that must be provided by the Provincial Treasury in finally settling the dispute.

**RICH ORE FROM ROSSLAND.**—The I. X. L. Mine, situated on the outskirts of the Rossland mining camp, is reported to be yielding rich free-milling ore again. Some months ago mining men were startled by the richness of the mineral being taken from this property. A syndicate of Rossland miners had opened up a small but exceedingly high-grade stringer from which several shipments were made that brought them remarkable returns. It was assumed that the "pay" ran out as nothing has been heard of the I. X. L. for a period. Development, however, has been in progress and, judging from the latest advice, the enterprise of the operators is likely to be further rewarded. It is stated that the mine has paid the new owners some \$30,000, all of which has been won by working on small rich veins.

**TRAIL ORE RECEIPTS.**—A total of 7072 tons of ore and concentrates were received at the Trail Smelter, Consolidated Mining & Smelting Co. of Canada, from the 15th to the 21st of January inclusive. Twelve custom shippers contributed 1322 tons, the remainder coming from company mines.

The week's shipments in detail follow:

|                                  |      |
|----------------------------------|------|
| Alamo, Alamo . . . . .           | 198  |
| Bell, Beaverdell . . . . .       | 44   |
| Black Rock, Northport . . . . .  | 87   |
| Company Mines . . . . .          | 5750 |
| Essame, Bruce . . . . .          | 30   |
| Knob Hill, Republic, Wn. . . . . | 105  |
| Lone Pine, Republic, Wn. . . . . | 312  |
| Maestro, Ainsworth . . . . .     | 25   |
| Paradise, Invermere . . . . .    | 44   |
| Quilp, Republic, Wn. . . . .     | 116  |
| Silversmith, Sandon . . . . .    | 175  |
| Surprise, Republic, Wn. . . . .  | 158  |
| Steel Group . . . . .            | 28   |

7,072

## NOVA SCOTIA

**COAL PRODUCTION RECORDS.**—The coal trade of Nova Scotia is booming. The Cumberland, Pictou, Inverness and Cape Breton Districts all show large increases over January, 1922. Indeed, the increase for the past month, would almost wipe out the 200,000 tons dropped last year. The British Empire Steel collieries in Cape Breton alone show an increase over last January of 175,000 tons. This concern aims at an output of 4,000,000 tons this year and considering the storms of the month of January which caused much idle time, a good beginning has been made.



**25,000 TON RAIL ORDER.**—Work has been commenced on the order for 25,000 tons of rails for the Canadian National Railways. This order will keep the rail mill busy until warm weather commences.

**BANKING COAL.**—The collieries at Sydney Mine are now operating by virtue of the banking of coal in preparation for shipment when Sydney harbour opens for navigation in the spring.

**LABRADOR GOLD REPORT.**—The press campaign to stimulate interest in the reported discoveries of placer gold in Labrador continues unabated. There is as yet no additional evidence in support of the truth of the statements made by those who are promoting the scheme.

**NO RED AFFILIATION.**—There is in the Nova Scotian collieries a decided feeling in support of the conclusion of U. M. W. A. headquarters that there must be no affiliation with the Russian Red organizations. The "radical" executive of the local miners' union have bowed to the decision of their headquarters with whatever grace they could muster.

Britain, whose prosperity depends essentially upon her export trade, is now profiting vastly from the industrial peace within her borders. Coal is the mainstay of her exports. First the great strike in the United States and now the French occupation of the Ruhr district have aided British coal exporters to regain their old markets and to capture new ones. The producers of iron and steel are commencing to share in this benefit.

With the new year there came into force the new administration of British railways in four great systems, the

great Western, the London Midland and Scottish, the London and Northeastern, and the Southern. It is anticipated that this will prove both economical and convenient, and it is expected that an immediate result will be the placing of large orders for much needed railway equipment.

The uses of Pyrex glass are being extended very rapidly. It is essentially a low-expansion boro-silicate glass of simple chemical composition, containing no metals of the magnesium-lime-zinc group and no heavy metals. Its coefficient of expansion is somewhat less than that of porcelain and is only one-ninth that of lead glass.

The Standard Conveyor Company has acquired by purchase all the rights, titles and patents pertaining to the well-known "Brown Portable" line of portable and sectional piling, elevating, conveying, loading and unloading machinery for the handling of packed and loose materials. This line of machinery has been manufactured by the Brown Portable Conveying Machinery Company at North Chicago for ten years. Until further notice the plant will be continued in operation by the Standard Conveyor Company, and all inquiries and correspondence regarding "Brown Portable" products should be addressed to Standard Conveyor Company, "Brown Portable" Products Plant, North Chicago, Illinois.

The Chief Consolidated Mine of Tintic, Utah, produced 4,437,000 ounces of silver in 1922, in addition to 19 million pounds of lead and 11,930 ounces of gold.

## INDEX TO MINE AND MILL SUPPLIES

Addresses of advertisers whose names appear in the following classified index, may be found upon reference to their advertisements. An alphabetical index to advertisers will be found on the page facing the inside back cover. The following regulations apply to all advertisers:—One-eighth page, every issue, three headings; one-quarter page, every issue, six headings; one half page, every issue, six headings; one half page, every issue, twelve headings; full page, every issue, twenty-four headings. Buyers who are unable to find in the classification heregiven such machinery or supplies as they desire are invited to write Service Dept., Canadian Mining Journal, Gardenvale, Que., who can in all probability, refer them to proper sources.

**Acetylene Gas:**  
Pres-O-Lite Co. of Canada, Ltd.

**Agitators:**  
The Dorr Co.  
Horton Steel Works, Limited.

**Air Compressors:**  
Belliss & Morcom Ltd.  
Canadian Ingersoll-Rand Co., Ltd.  
Denver Rock Drill Mfg. Co., Ltd.  
Herbert, Alfred, Limited  
Holman Bros., Ltd.  
Laurie & Lamb.  
Sullivan Machinery.

**Air Hoists:**  
Canadian Ingersoll-Rand Co. Ltd.  
Denver Rock Drill Mfg. Co.  
Herbert, Alfred, Limited.  
Holman Bros., Ltd.

**Air Receivers:**  
Canadian Ingersoll-Rand Co., Ltd.

**Alloy & Carbon Tool Steel:**  
Peacock Bros., Ltd.

**Amalgamators:**  
Mine & Smelter Supply Co.

**Asbestos:**  
Everitt & Co.

**Ash Handling Machinery:**  
Canadian Link-Belt Co., Ltd.  
Canadian Mead-Morrison Co.

**Assayers and Chemists:**  
Ledoux & Co.

Thos. Hayes & Son.

**Assayer's and Chemists' Supplies:**  
Lymana, Limited.  
Mine & Smelter Supply Co.

### Balls:

Hebert, Alfred, Limited  
Holman Bros., Ltd.  
Hull Iron & Steel Foundries, Ltd.  
Peacock Brothers, Limited.  
The William Kennedy & Sons, Ltd.

### Ball Mills:

Herbert, Alfred, Limited.  
Holman Bros., Ltd.  
Hull Iron & Steel Foundries, Ltd.  
Mine & Smelter Supply.

### Ball Mill Feeders:

Herbert, Alfred, Limited.  
Holman Bros., Ltd.  
Hull Iron & Smelter Supply.  
Mine & Smelter Supply.

### Ball Mill Linings:

Canadian Steel Foundries, Ltd.  
The William Kennedy & Sons, Ltd.  
Peacock Bros., Ltd.  
Hull Iron & Steel Foundries, Ltd.  
Mine & Smelter Supply.

### Balances — Assay & Analytical:

Mine & Smelter Supply.

### Beltting — Leather, Rubber & Cotton:

Canadian Link-Belt Co., Ltd.  
Jones & Glassco (Regd.).

### Beltting:

Gutta Percha & Rubber, Ltd.

### Beltting — Silent Chain:

Canadian Link-Belt Co., Ltd.  
Hans Renold of Canada, Ltd.,  
Jones & Glassco (Regd.).

### Beltting (Conveyor):

Gutta Percha & Rubber, Ltd.  
Dunlop Tire & Rubber Co., Ltd.

### Bins & Hoppers:

Can. Chicago Bridge & Iron Co., Ltd.  
Horton Steel Works, Ltd.  
The William Kennedy & Sons, Ltd.

### Bluestone:

The Consol'd Mining & Smelting Co.

### Boilers:

The William Kennedy & Sons, Ltd.

### Boxes, Cable Junction:

Standard Underground Cable Co. of  
Canada, Ltd.  
Northern Electric Co., Ltd.

### Buggies, Mine Car (Steel):

Hendrick Manufacturing Co.  
Herbert, Alfred, Limited.  
Holman Bros., Ltd.

### Brazilian Ballas:

Diamond Drill Carbon Co.

### Brick:

Wettlaufer Bros.

### Bronze, Manganese, Perforated & Plain:

Hendrick Manufacturing Co.

### Buckets:

Canadian Ingersoll-Rand Co., Ltd.  
Canadian Link-Belt Co. Ltd.  
Hadfields, Limited.  
Hendrick Manufacturing Co.  
Herbert, Alfred, Limited.  
Holman Bros., Ltd.  
The William Kennedy & Sons, Ltd.  
Peacock Bros., Ltd.

### Bucket Lips:

Canadian Steel Foundries, Ltd.  
The William Kennedy & Sons, Ltd.

### Cable — Aerial and Underground:

Canada Wire & Cable Co.  
Standard Underground Cable Co. of  
Canada Ltd.  
Peacock Brothers, Limited.



**Dredging Ropes:**

Allan Whyte & Co.  
Greening, B., Wire Co., Ltd.

**Drills, Air and Hammer:**

Canadian Ingersoll-Rand Co., Ltd.  
Canadian Rock Drill Co.  
Denver Rock Drill Mfg. Co., Ltd.  
Herbert, Alfred, Limited  
Holman Bros. Ltd.  
Sullivan Machinery Co.  
The Mine & Smelter Supply Co.

**Drills—Core:**

Canadian Ingersoll-Rand Co., Ltd.  
Herbert, Alfred, Limited  
Holman Bros., Ltd.  
Sullivan Machinery Co.

**Drill Steel Furnaces:**

Canadian Ingersoll-Rand Co., Ltd.  
Denver Rock Drill Mfg. Co.  
Herbert, Alfred Limited  
Holman Bros., Ltd.  
Sullivan Machinery Co.

**Drills—Diamond:**

Sullivan Machinery Co.

**Drill Steel—Mining:**

Canadian Ingersoll-Rand Co., Ltd.  
Hadfields, Limited  
Mussens, Limited

**Drill Steel Sharpeners:**

Canadian Ingersoll-Rand Co., Ltd.

**Electric Condensers:**

Griswold & Co.  
Canadian Rock Drill Co.  
Denver Rock Drill Mfg. Co., Ltd.  
Herbert, Alfred, Limited  
Holman Bros., Ltd.  
Northern Canada Supply Co.

**Drills—Electric:**

Herbert, Alfred, Limited  
Holman Bros. Ltd.  
Sullivan Machinery Co.  
Northern Electric Co., Ltd.

**Drills—High Speed and Carbon:**

Hadfields, Limited  
Herbert, Alfred, Limited  
Holman Bros. Ltd.

**Ejectors:**

Canadian Ingersoll-Rand Co., Ltd.

**Electric Hoists:**

Canadian Mead-Morrison Co.

**Elevators:**

Canadian Link-Belt Co., Ltd.  
Sullivan Machinery Co.  
Northern Canada Supply Co.  
Hadfields, Limited.  
Jones & Glassco (Regd.).

**Engineering Instruments:**

Laurie & Lamb.  
C. L. Berger & Sons.

**Oil Engines:**

Canadian Ingersoll-Rand Co., Ltd.

**Engines:**

Canadian Sirrocco Co., Ltd.

**Engines—Gas and Gasoline:**

Sullivan Machinery Co.  
Gould, Shapely & Muir Co., Ltd.  
Laurie & Lamb.  
The Mine & Smelter Supply Co.

**Engines—Haulage:**

Canadian Ingersoll-Rand Co., Ltd.

**Engines—Steam:**

Canadian Ingersoll-Rand Co., Ltd.  
Laurie & Lamb.

**Engineers:**

Coyne, Alfred F. A.  
Dresser, John A.  
Door Co.  
Ferrier, W. F.  
Hore, R. E.  
Heves & Sons, Thos.  
Hersey Co., Ltd. Milton.  
McEvoy, James C.  
Rogers, George R.  
Ross, Jas. G.  
Stewart, Robert H.  
Tyrrell, J. B.  
Whitman, Alfred B.  
Wilson, Ridgway R.

**Exhauster:**

Canadian Sirrocco Co., Ltd.

**Ferro-Alloys (all Classes):**

Canadian Steel Foundries, Ltd.  
Canadian Steel Foundries, Ltd.  
Everitt & Co.

**Fire Fighting Supplies:**

Gutta Percha & Rubber, Ltd.

**Flood Lamps:**

Northern Electric Co., Ltd.

**Flotation Oil:**

Hercules Powder Co.

**Flourspare:**

Consolidated Mining & Smelting Co.  
Everitt & Co.

**Forging:**

Canada Foundry & Forging, Ltd.

Herbert, Alfred, Limited  
Holman Bros., Ltd.  
Hull Iron & Steel Foundries, Ltd.  
Smart-Turner Machine Co.

**Coal Screening Plants:**

Canadian Link-Belt Co., Ltd.  
Canadian Mead-Morrison Co.

**Cobalt Oxide:**

Everitt & Co.

**Compressors—Air:**

Belliss & Morcom, Ltd.  
Canadian Ingersoll-Rand Co., Ltd.  
Denver Rock Drill Mfg. Co.  
Herbert, Alfred, Limited  
Holman Bros., Ltd.  
Laurie & Lamb.  
Smart-Turner Machine Co.  
Peacock, Brothers, Limited.

**Concrete Mixers:**

Gould, Shapely & Muir Co., Ltd.

**Condensers:**

Canadian Ingersoll-Rand Co. Ltd.  
Smart-Turner Machine Co.  
Belliss & Morcom, Ltd.  
Laurie & Lamb.  
Peacock Brothers, Ltd.

**Concentrating Tables:**

Herbert, Alfred, Limited  
Holman Bros., Ltd.  
The Mine & Smelter Supply Co.

**Condensers—Electrical Static & Power:**

Griswold & Co.

**Consulters and Engineers:**

Milton Hersey Co., Ltd.

**Conveyors:**

Canadian Link-Belt Co., Ltd.  
Canadian Mead-Morrison Co.  
Jones & Glassco (Regd.).

**Conveyor Belts:**

Gutta Percha and Rubber, Ltd.

**Conveyor Flights:**

Canadian Link-Belt Co., Ltd.

**Conveyor—Trough—Belt:**

Canadian Link-Belt Co., Ltd.  
Hendrick Mfg. Co.  
Jones & Glassco, Regd.

**Copper:**

Consolidated Mining & Smelting Co.

**Couplings:**

Hans Renold of Can., Ltd.

**Cranes:**

Canadian Link-Belt Co., Ltd.  
Canadian Mead-Morrison Co.  
Peacock Brothers, Limited  
Smart-Turner Machine Co.

**Crane Ropes:**

Allan Whyte & Co.  
Canada Wire & Cable Co.  
Greening, B., Wire Co., Ltd.

**Crucibles:**

The Mine & Smelter Supply Co.

**Crusher Balls:**

Canada Foundries & Forgings, Ltd.  
Herbert, Alfred, Limited  
Holman Bros., Ltd.  
Hull Iron & Steel Foundries, Ltd.  
Peacock Brothers, Limited  
The William Kennedy & Sons, Ltd.

**Crushers:**

Canadian Ingersoll-Rand Co., Ltd.  
Herbert, Alfred, Limited  
Holman Bros., Ltd.  
Hull Iron & Steel Foundries, Ltd.  
Wettlaufer Bros.  
Lyman, Limited  
The Mine & Smelter Supply Co.  
Hendrick Mfg. Co.

**Cut Gears:**

Hans Renold of Can., Ltd.  
Jones & Glassco, Regd.  
The William Kennedy & Sons, Ltd.

**Cyanide:**

Cyanide Plant Equipment:  
The Door Co.  
The Mine & Smelter Supply Co.

**Derricks:**

Smart-Turner Machine Co.

**Diamond Drill Contractors:**

Smith & Travers  
Sullivan Machinery Co.

**Digesters:**

Can Chicago Bridge & Iron Co., Ltd.  
Hull Iron & Steel Foundries, Ltd.

**Diesel Engines:**

Belliss & Morcom, Ltd.  
Laurie & Lamb.

**Dies:**

Canada Foundries & Forgings, Ltd.  
Herbert, Alfred, Limited  
Hull Iron & Steel Foundries, Ltd.  
Holman Bros., Ltd.

**Drain Tile:**

Wettlaufer Brothers.

**Dredges:**

Canadian Mead-Morrison Co.

**Dredger Pins:**

Hull Iron & Steel Foundries, Ltd.

**Dredging Machinery:**

Hadfields, Limited  
Hull Iron & Steel Foundries Ltd.

**Cages:**

Canadian Ingersoll-Rand Co. Ltd.  
The Mine & Smelter Supply Co.  
Herbert, Alfred, Limited.  
Holman, Ltd.

The William Kennedy & Sons, Ltd.

**Cables—Wire:**

Standard Underground Cable Co. Ltd.  
Canada Wire & Cable Co.

**Cable Railway Systems:**

Canada Wire & Cable Co.

**Cam Shafts:**

Canada Foundries & Forgings, Ltd.  
Hebert, Alfred, Limited  
Holman Bros., Ltd.  
Hull Iron & Steel Foundries, Ltd.  
Peacock Brothers, Ltd.  
The William Kennedy & Sons, Ltd.

**Car Dumps:**

Canadian Mead-Morrison Co.  
Herbert, Alfred, Limited.  
Holman Bros., Ltd.  
Sullivan Machinery Co.

**Cars:**

Canadian Mead-Morrison Co.  
Herbert, Alfred, Limited.  
Holman Bros., Ltd.  
John J. Gartshore.  
Peacock Brothers, Limited.  
The William Kennedy & Sons, Ltd.

**Car Pullers:**

Canadian Mead-Morrison Co.

**Car Wheels and Axles:**

Herbert, Alfred, Limited.  
Holman Bros., Ltd.  
Hull Iron & Steel Foundries, Ltd.  
John J. Gartshore.  
Peacock Brothers, Limited  
The William Kennedy & Sons, Ltd.

**Carriers (Gravity):**

Jones & Glassco, Reg.

**Cast Steel Gears:**

Canada Foundries, Ltd.  
The William Kennedy & Sons, Ltd.

**Castings (Iron and Steel):**

Herbert, Alfred, Limited.  
Holman Bros., Ltd.  
Hull Iron & Steel Foundries, Ltd.  
Peacock Brothers, Limited.  
The William Kennedy & Sons, Ltd.

**Cement Machinery:**

Hadfields, Limited.  
Hull Iron & Steel Foundries, Ltd.  
The William Kennedy & Sons, Ltd.

**Chains:**

Jones & Glassco, Reg.  
Canadian Link-Belt Co., Ltd.  
Greening, B., Wire Co., Ltd.

**Chain Drives:**

Jones & Glassco (Regd.)

**Chain Drives—Silent and Steel Roller:**

Canadian Link-Belt Co. Ltd.  
Hans Renold of Can., Ltd.  
Jones & Glassco (Regd.).

**Chemist:**

Thos. Heyes & Sons.  
Milton Hersey Co.  
Ledoux & Co.

**Chrome Ore:**

Everitt & Co.

**Crusher Jaws:**

Canadian Steel Foundries, Ltd.  
The William Kennedy & Sons, Ltd.

**Crushing Rolls:**

Canadian Steel Foundries, Ltd.  
The William Kennedy & Sons, Ltd.

**Classifiers:**

The Door Company

**Clutches:**

Canadian Link-Belt Co., Ltd.  
Hans Renold of Can., Ltd.

**Coal:**

Dominion Coal Co.  
Nova Scotia Steel & Coal Co.

**Coal Cutters:**

Sullivan Machinery Co.  
Canadian Ingersoll-Rand Co., Ltd.  
Hebert, Alfred, Limited  
Holman Bros., Ltd.  
Peacock Brothers, Limited

**Coal Crushers:**

Canadian Link-Belt Co., Ltd.  
Peacock Brothers, Limited.

**Coal Mining Machinery:**

Canadian Ingersoll-Rand Co., Ltd.  
Canadian Rock Drill Co.  
Denver Rock Drill Lfg. Co., Ltd.  
Sullivan Machinery Co.  
Hadfields, Limited.  
Hendrick Mfg. Co.  
Hebert, Alfred, Limited  
Holman Bros., Ltd.



**Pipes:**

Consolidated Mining & Smelting Co.  
Coal and Coke Handling Machinery  
Canadian Link-Belt Co., Ltd.

**Coal Pick Machines:**

Canadian Ingersoll-Rand Co., Ltd.  
Herbert, Alfred, Limited.  
Horton Steel Works, Ltd.  
Sullivan Machinery Co.

**Forges:**

Canadian Steel Foundries, Ltd.  
Hull Iron & Steel Foundries  
John J. Gartshore.

**Furnaces—Assay:**

Lyman, Limited.  
Mine & Smelter Supply Co.

**Gasoline Engines:**

Bellis & Morcom, Ltd.  
Laurie & Lamb.

**Gasoline Extraction Compressors:**

Canadian Ingersoll-Rand Co., Ltd.  
Sullivan Machinery Co.

**Gasoline Tanks:**

Can. Chicago Bridge & Iron Co., Ltd.  
Horton Steel Works, Ltd.

**Gaskets:**

Gutta Percha & Rubber, Ltd.

**Gears:**

Hans Renold of Canada, Ltd.  
Jones & Glassco, Regd.  
The William Kennedy & Sons, Ltd.

**Gears (Cast):**

Canadian Link-Belt Co., Ltd.  
Hull Iron & Steel Foundries, Ltd.  
The William Kennedy & Sons, Ltd.

**Gears, Machine Cut:**

The Hamilton Gear & Machine Co.  
The William Kennedy & Sons, Ltd.

**Gold Refiners:**

Goldsmith Bros.

**Gold Trays:**

Can. Chicago Bridge & Iron Works, Ltd.  
Horton Steel Works, Ltd.

**Grab Buckets:**

Canadian Mead-Morrison Co.

**Hand Cars:**

Sylvester Mfg. Co., Ltd.

**Hose:**

Goodyear Tire & Rubber Co.  
Gutta Percha & Rubber, Ltd.  
Dunlop Tire & Rubber Co.

**Hammer Rock Drills:**

Canadian Ingersoll-Rand Co., Ltd.  
Canadian Rock Drill Co.  
Denver Rock Drill Mfg. Co., Ltd.  
Herbert, Alfred, Ltd.  
Sullivan Machinery Co.

**Hangers and Cables:**

Stan. Underground Cable Co., Ltd.

**Heating Systems:**

Canadian Sirocco Co., Ltd.

**High Speed Steel:**

Hadfields, Ltd.

**Hoists—Air, Electric and Steam:**

Canadian Ingersoll-Rand Co., Ltd.  
Canadian Rock Drill Co.  
Denver Rock Drill Mfg. Co., Ltd.  
Herbert, Alfred, Ltd.  
Holman Bros., Ltd.  
Jones & Glassco, Regd.  
Mine & Smelter Supply Co.  
Canadian Link-Belt Co., Ltd.  
Peacock Bros., Ltd.  
Sullivan Machinery Co.

**Hoisting Towers:**

Canadian Mead-Morrison Co.

**Hose:**

Gutta Percha & Rubber, Ltd.

**Hydraulic Machinery:**

Hadfields, Ltd.  
Bellis & Morcom, Ltd.  
Laurie & Lamb.  
The William Kennedy & Sons, Ltd.

**Oil Storage Tanks:**

Can. Chicago Bridge & Iron Co., Ltd.  
Horton Steel Works, Ltd.  
The Toronto Iron Works, Ltd.

**Industrial Chemists:**

Hersey, M. & Co., Ltd.

**Insulating Compounds:**

Stan. Underground Cable Co.

**Inspectors:**

Hersey, M. & Co., Ltd.

**Jacks:**

Northern Canada Supply Co.

**Jaw & Gyratory Crushers:**

Engineering & Equipment  
Herbert, Alfred, Limited  
Holman Bros., Ltd.

**Lamp-Miners:**

Northern Electric Co.  
Peacock Bros., Ltd.

**Lead (Pig):**

Consolidated Mining & Smelting Co.

**Levels:**

C. L. Berger & Sons.

**Light & Heavy Steel Plate Construction:**

Hendrick Mfg. Co.  
The William Kennedy & Sons, Ltd.

**Locomotives (Steam, Compressed Air and Storage):**

Canadian Ingersoll-Rand Co., Ltd.  
Laurie & Lamb.

**Link Belt:**

Canadian Link-Belt Co., Ltd.  
Northern Canada Supply Co.  
Jones & Glassco, Regd.

**Machine Guards:**

Greening, B. Wire Co., Ltd.

**Magnesium Metal:**

Everitt & Co.  
Hull Iron & Steel Foundries, Ltd.

**Manganese Steel:**

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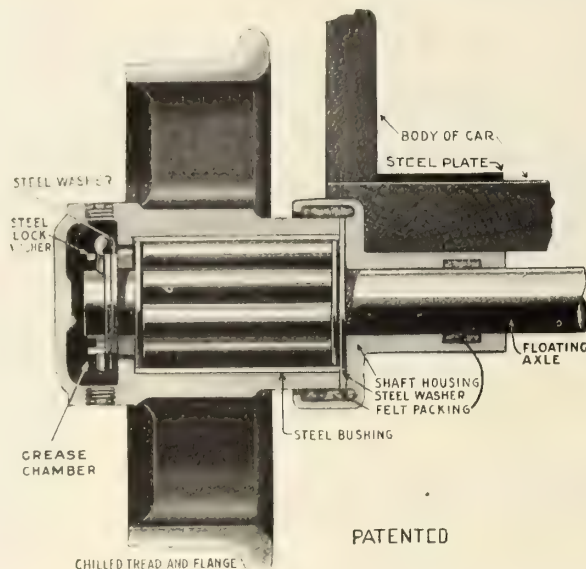
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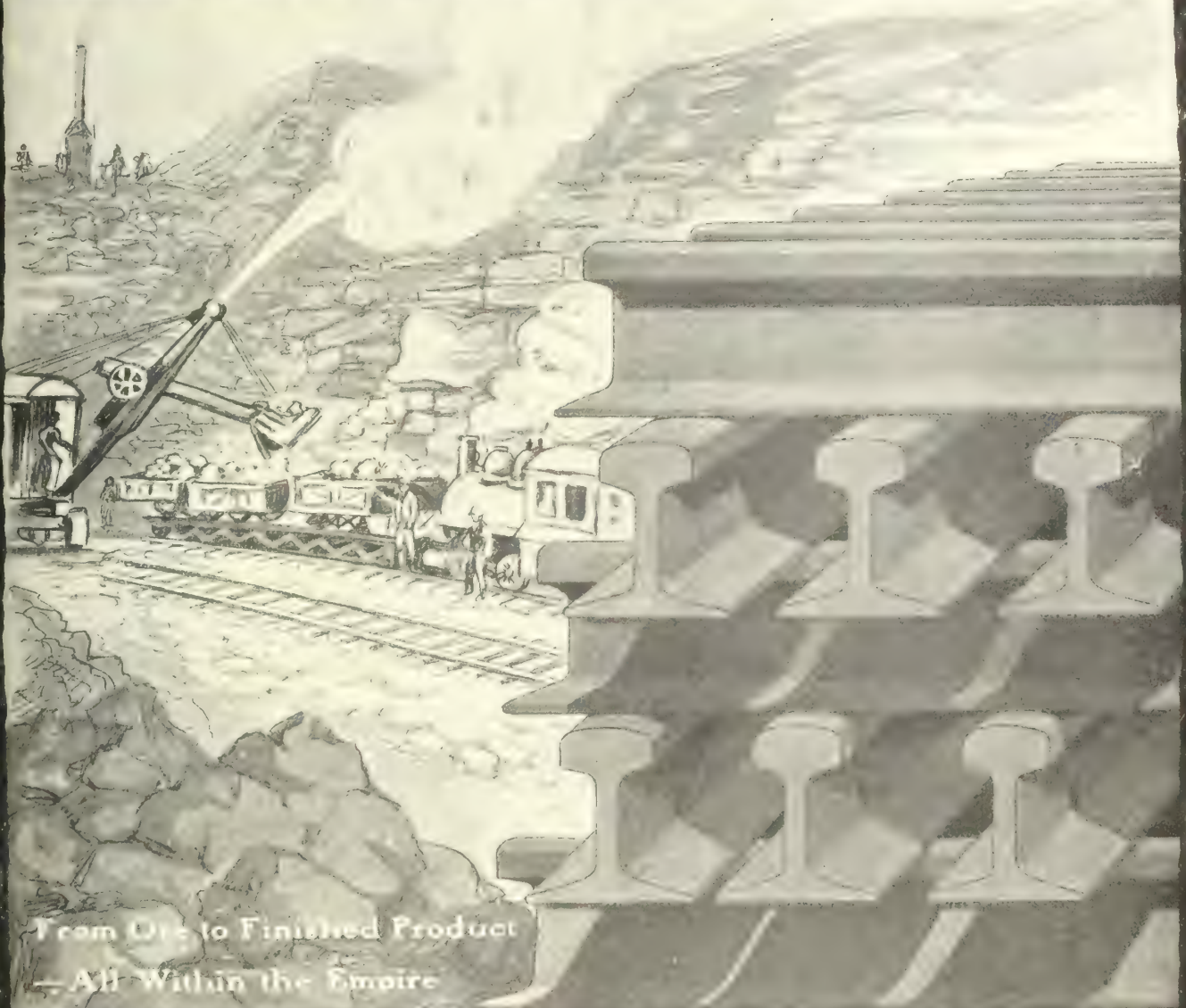
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Western Representatives: Bissett & Webb Limited, Winnipeg



# Ontario's



# Minerals

PROVINCE OF ONTARIO

DEPARTMENT OF MINES

HON H. MILLS, Minister of Mines

## Mineral Areas.

Ontario, with its 407,262 square miles, contains many millions of acres in which the geological formations are favorable for the occurrence of minerals, 70 per cent of the area being underlain by rocks of pre-Cambrian age. The phenomenally rich silver mines of Cobalt occur in these rocks; so also do the far-famed nickel-copper deposits of Sudbury, the gold of Porcupine and Kirkland Lake, and the iron ore of Magpie and Moose Mountain mines.

## Economic Minerals.

In addition to the above, practically all economic minerals (coal and tin excepted) are found in Ontario:—actinolite, apatite, arsenic, asbestos, cobalt, corundum, feldspar, fluor-spar, graphite, gypsum, iron pyrites, lead, mica, molybdenite, natural gas, palladium, petroleum, platinum, quartz, salt, talc and zinc. This Province has the largest deposits on the continent of talc, feldspar, mica and graphite.

Building materials, such as ornamental marble, limestone, sandstone, granite, trap, sand and gravel, lime, portland cement, brick and tile, meet every demand.

## Mineral Production.

Preliminary returns show the output of the mines and metallurgical works of the Province for the year 1921 to be worth \$48,128,387, of which the metallic production was \$27,574,202.

The following figures show the rapid growth of Ontario's mineral industry by five-year periods since 1891:

| Year.      | Value.      | Year.      | Value.       |
|------------|-------------|------------|--------------|
| 1891 ..... | \$4,705,672 | 1906 ..... | \$22,388,383 |
| 1896 ..... | 5,235,003   | 1911 ..... | 41,976,797   |
| 1901 ..... | 11,831,086  | 1916 ..... | 65,303,822   |

## Dividends.

Dividends and bonuses paid to the end of 1921 amounted to \$23,140,734 for gold mining companies, and \$84,388,185 for silver mining companies or a total of \$107,528,919.

## Mining Regulations.

A miner's license costs \$5.00 per annum, and entitles the holder to stake out in any or every mining division three claims of 40 acres each. After performing 200 days' assessment work on a claim, patent may be obtained from the Crown on payment of \$2.50 or \$3.00 per acre, depending on location in unsurveyed or surveyed territory.

## Assay Office.

The Provincial Assay Office at No. 5 Queen's Park, Toronto, is maintained by the Department of Mines for the free identification of minerals, free assays under the provisions of the Mining Act of Ontario, and also for general assay work as per the Schedule of Charges which may be obtained on application.

## Temiskaming Testing Laboratories

The Department maintains, at Cobalt, an ore sampling and testing laboratory which is now prepared to receive parcels of gold ore from 100 pounds upward, and after sampling and assaying the same to pay to the shipper the value thereof, less treatment charges. The purpose is to afford a market for ores extracted by prospectors and others in developing their mining claims, enabling them to obtain funds which they can use for further work and to report on the most satisfactory method of treatment. Fuller information may be obtained on application to the Manager, Temiskaming Testing Laboratories, Cobalt, Ontario.

## Publications.

For list of publications, illustrated reports, geological maps and mining laws, apply to

**THOS. W. GIBSON,**  
Deputy Minister of Mines,  
TORONTO, CANADA.

# CANADA

## DEPARTMENT OF MINES

HON. CHARLES STEWART, *Minister*

CHARLES CAMSELL, *Deputy Minister*

### MINES BRANCH

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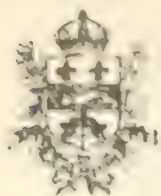
- Phosphate in Canada, by H. S. Spence.  
The Preparation, Transportation and Combustion of Powdered Coal, by John Blizard.
- Road Materials along the St. Lawrence River, from Quebec Boundary to Cardinal, Ont., by R. H. Picher.
- Building and Ornamental Stones of Canada (British Columbia.) Vol. V., by W. A. Parks, Ph. D.
- Barium and Strontium in Canada, by H. S. Spence.  
The Coalfields and Coal Industry of Eastern Canada, by F. W. Gray.
- The Value of Peat Fuel for the Generation of Steam, by J. Blizard, B. Sc.
- Analyses of Canadian Fuels. Parts I to V, by E. Stansfield M. Sc., and J. H. H. Nicolls, M. Sc.
- Graphite by H. S. Spence.
- Gas Producer Trials with Alberta Coals, by J. Blizard and E. S. Malloch.
- Summary Report of the Mines Branch, 1920.  
The Mines Branch maintains the following laboratories in which investigations are made with a view to assisting in the development of the general mining industry of Canada:—
- Fuel Testing Laboratory.**—Testing value of Canadian fuels for steam raising and production of power gas; analyses, and other chemical and physical examinations of solid, liquid and gaseous fuels are also made.
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- Applications for reports and particulars** relative to having investigations made in the several laboratories should be addressed to **The Director, Mines Branch, Department of Mines, Ottawa.**
- Summary Report.** The annual Summary Report of the Geological Survey is now printed in parts. Applicants should, therefore, state what particular geologist report is required, or what subject they are interested in.
- Memoir 108.** The Mackenzie River Basin, by Charles Camsell and Wyatt Malcolm.

### GEOLOGICAL SURVEY

#### Recent Publications

- Memoir 119.** The Reed-Wekusko Map-Area, Northern Manitoba, by F. J. Alcock.
- Memoir 121.** The Malagash Salt Deposit, Cumberland County, N. S., by A. O. Hayes.
- Memoir 123.** Sixtymile and Ladue Rivers Area, Yukon, by W. E. Cockfield.
- Memoir 125.** Sedimentation of the Fraser River data, by W. A. Johnston.
- Memoir 127.** Beauceville map-area, Quebec, by B. R. McKay.
- Memoir 128.** Winnipegosis and Upper Whitemouth River areas, Manitoba, Pleistocene and Recent deposits, by W. A. Johnston.
- Memoir 130.** Geology and mineral deposits of the Bridge River map-area, British Columbia, by W. S. McCann.
- Memoir 131.** Kenogami, Round and Larder Lake areas, Timiskaming district, Ontario, by H. C. Cooke.
- Map 1585.** Mackenzie River basin, 1922 edition. Geology.
- Map 1751.** Wainwright, Alberta. Topography.
- Map 1752.** Monitor, Alberta and Saskatchewan. Topography.
- Map 1754.** Upper Elk and Highwood rivers, British Columbia and Alberta. Topography.
- Map 1829.** Salmon River area, Portland Canal mining division, B. C. Geology.
- Map 1831.** Vegreville; townships 47 to 55, ranges 11 to 10 west of the 4th meridian, Alberta. Topography.
- Map 1835.** Beauceville, Beauce county, Quebec. Geology.
- Map 1836.** Explored routes in a belt traversed by the Canadian National Railways between Longlac and Nipigon, Ontario. Geology.
- Map 1860.** Keno Hill area, Mayo district, Yukon. Geology.
- Map 1882.** Bridge River, B. C. Geology.
- Map 1901.** Upper Kitzault valley, B. C. Geology.
- Map 1948.** Wanapitei Lake area, Ont. Geology.
- Applicants for publications not listed above should mention the precise area concerning which information desired.
- The Geological Survey will, under certain limitations, give information and advice upon subjects relating to general and economic geology. Mineral and rock specimens, when accompanied by definite statements of localities, will be examined and their nature reported upon.
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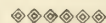
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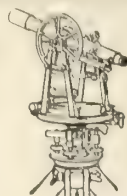
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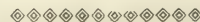
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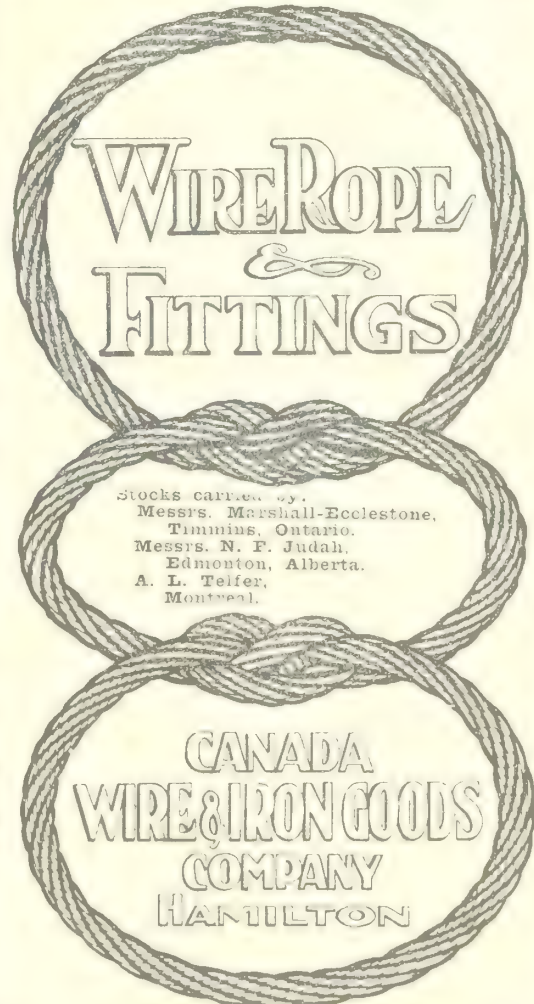
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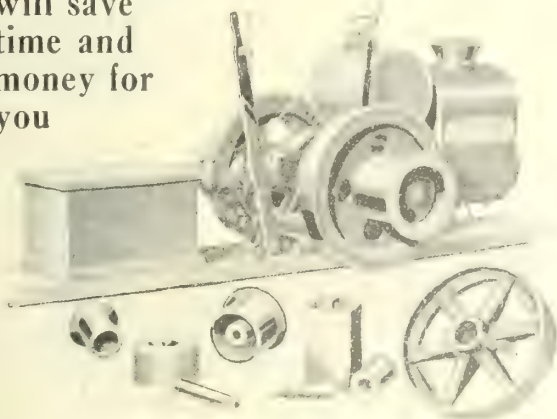


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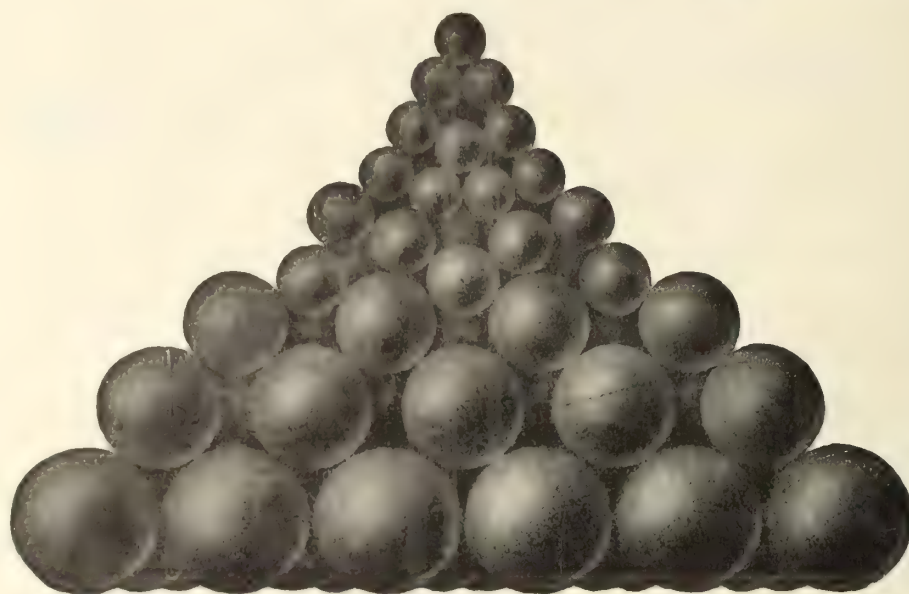
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VOL. XLIV

GARDENVALE, Que., February 16th, 1923

No. 7

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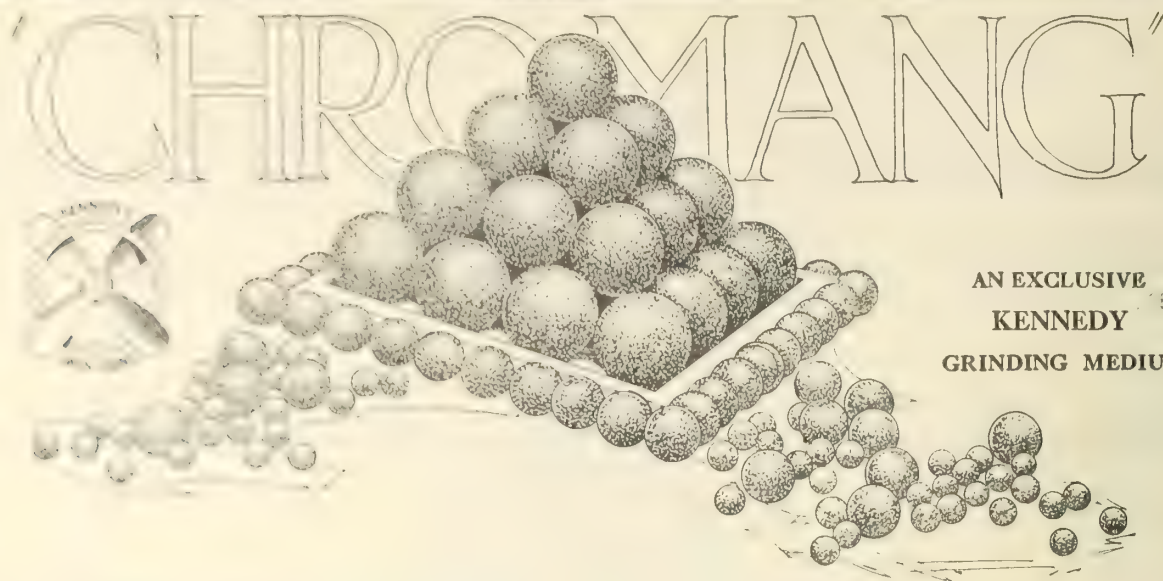
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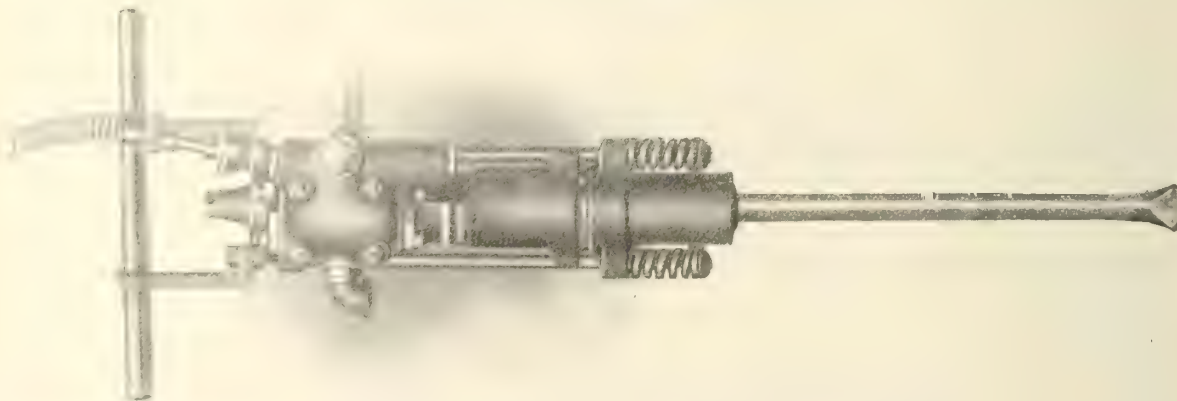
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## -:- EDITORIAL -:-

*Let us remember that the [mining engineering] profession requires more than the mere honesty and personal integrity that every right minded man must have. It requires... watchfulness against fraud and... dangerous enthusiasm, — watchfulness indeed even against his own hope and enthusiasm.— J. B. Porter—1897*

### FOREWARNED — FOREARMED

The remarkable progress made by the Kirkland Lake gold field of Northern Ontario and the promise of its extension far eastward into the province of Quebec have already stimulated some thought and much talk about its future. The issue will rest principally, of course, upon what the prospector discovers and what the miner develops; but pending the decision to be reached in the newer parts of the fifty-mile belt of gold-bearing rocks, it is interesting to speculate upon the possible course of events. There is no doubt that those concerned with the guidance of the district's affairs in a broad way have already studied seriously its main problems of the future — transportation and power.

The logical route for the railway that will be required to open up this long gold field, should even isolated parts of it prove to be economically productive, is directly along the belt; that is a branch line from the Ontario Government Railway through the Kirkland field as far eastward as the mines may prove to extend. Within twenty-five miles, however, one comes against an invisible barrier, the inter-provincial boundary. How serious an obstacle this may be, only a test will prove. Moreover the territory on the Quebec side is naturally tributary to the Canadian Pacific Railway by way of the extension of its Temiskaming line northward to the Transcontinental line of the Canadian National Railways. This latter would, however, involve a new line one hundred miles long to tap the gold district, as against a line up to a length of, say, fifty miles from Kirkland that would traverse the gold district throughout. In the meantime it is interesting to know that the engineers of the Ontario Government Railway are already surveying the route for a branch railway eastward, and that the Canadian Pacific extension has been at least commenced.

If the newer parts of the gold district live up to their present promise they will require hydro-electric power far in excess of what can be supplied by present or possible developments on the Ontario side. The gold belt is only a few miles south of the height of land between the St. Lawrence and James Bay, and the comparatively small rivers on the Ontario side

within reach of the field can provide little more power than at present. On the Quebec side, however, there is potential power in plenty. The Quinze River, which constitutes the upper reaches of the Ottawa River, is the principal tributary of Lake Temiskaming and drains an area of 9,500 square miles extending two hundred miles eastward from that lake. The total power available from the fifteen falls and rapids that give the river its name is estimated at 93,700 horsepower. All these are on the eighteen miles of river between Lake Temiskaming and Quinze Lake, and some of them are said to be capable of cheap development.

The unnecessary and untoward delay in granting water-power rights to the Hollinger company has been due principally to lack of foresight combined with lack of executive ability in the public officials entrusted now and formerly with the disposal of that part of the public domain. The year's obstruction of development has cost the company, the province and the Dominion ten million dollars. Other companies have suffered in lesser degree. Canada and Canadians could have made very good use of that ten million dollars; it is a stiff price to pay for human failings. Nature will yield that unwon gold eventually; but we need it now.

We hope the future of the power supply for the newer field will be provided for with more foresight than in the former case. All are now well warned, and there will be no excuse for a lack of prevision. The waters of the Quinze River can provide power even for a second 'Rand, should we be fortunate enough to discover such a phenomenon in northern Ontario and Quebec.

### THE LIVING WAGE

In Great Britain just now, a good deal is being said and written anent what is called "the living wage." The big showing made by the Labor party at the last general election is, no doubt, responsible for the prominence that this subject has achieved in that country. For there can be little or no question but that, should the Labor party obtain a Parliamentary majority at any time, strong efforts would be made to establish a "living wage" by means of legislation.



Nor is it only in Great Britain that this question is likely to be prolific of ample discussion in the near future. As part of the announced program of a large section of organized labor and of members of the so-called progressive element in the newly-elected United States Congress, the living wage seems likely to be discussed even more in the future than in the recent past. Indeed, one United States senator, who has enjoyed a reputation for constructive ideas, has announced that he intends to propose a law guaranteeing railway workers a living wage, although the Transportation Act already contains rules under which it is possible easily to arrive at fair wages for railway employees. A proposal that is arousing so much interest in Great Britain and the United States is likely to be canvassed pretty extensively in this country, too.

In these circumstances, it is advisable to get some idea as to what the expression, a "living wage" means in the mouths of those who use it so glibly. It appears that a living wage from the organized labor standpoint means a purely imaginary amount that scientific budget makers think all workers in a given class of employment should have. In the case of the United States railway shopmen, their "economists" figured out that a living wage for shopmen ought to be something over \$2,000 annually. The United States miners have set similar standards for themselves—perhaps because they employ the same "economists."

In all of Labor's discussion of the living wage, what a given industry can pay is ignored. In other words the issue from Labor's standpoint is not what labor produces but what the workers would like to have in order to maintain a certain scale of living. This phase of the matter is very illuminating as being typical of the temper in which organized Labor, in so many lands, approaches the problem of wages today.

The Court of Appeals of the District of Columbia in handing down a decision declaring the minimum wage law of the district unconstitutional made some observations that constitute a valuable contribution to this whole subject, especially since so-called living wages inevitably become minimum wages. The court says: "A wage based upon competitive ability is just, and leads to frugality and honest industry, and inspires an ambition to attain the highest possible efficiency, while the equal wage paralyzes ambition and promotes prodigality and indolence. It takes away the strongest incentive to human labor, thrift and efficiency and works injustice to employee and employer alike, thus affecting injuriously the whole social and industrial fabric. Experience has demonstrated that a fixed minimum wage means, in the last analysis, a fixed wage; since the employer, being compelled to advance some to a wage higher than their earning capacity, will, to equalize the cost of operation, lower the wage of the more competent to the common basis."

No doubt, those who believe that it is the function of

the State to order the lives of all its citizens, from the cradle to the grave, will be little influenced by considerations such as these. But that the arbitrary fixation of wages is not merely undesirable, but impracticable, will be obvious to most people of common-sense who believe that there is still a place for ambition, industry and skill in the industrial world.

### RESEARCH IN MINES

The typical miner is an individualist. There are many evidences of this fact, as well as good and sufficient reasons for it, which it is not our intention to discuss at present. We wish to draw attention to one result of the miner's tendency to individualism that has the effect of retarding progress in the industry. This is his comparative neglect of organized, consistent scientific research.

Every miner must be a researcher to some extent, else he will fail in his work. The natural conditions surrounding his work are so infinitely varied that he must study them without ceasing and adapt himself and his methods to them continuously. He does this, in the main, unconsciously, having developed this habit of instant and complete adaptation from the very beginning of his mining experience. The miner, the foreman, the engineer and the manager, all have developed this faculty for coping successfully with new and unforeseen natural conditions as rapidly as they come to view. They are well on the way to being successful scientific researchers.

Here, however, the effort to control and direct often ceases. The miner is prone to stop his effort as soon as the pressure of immediate necessity is released. He does not of habit press forward into the unknown, to meet and solve difficulties before they actually force themselves upon his notice. He is noted more for his dogged determination in overcoming difficulties than for his skill in foreseeing and avoiding them. In this he has lagged behind his fellow-worker, the metallurgist.

A few weeks ago Professor Graham pointed out very aptly in these pages one of the chief obstacles the miner must overcome if he is to conduct experiments and improve his methods. The laboratory is of comparatively little assistance to him; his experiments must be made principally on the grand scale, in the mine itself. This is bound to be costly at times, and sometimes dangerous, so few are willing to risk it.

Happily the spirit of "laissez-faire" among our mining engineers is not now so nearly universal as it was even a few years ago. An increasing number are showing their practical appreciation of the utility of systematic work of investigation and are applying the idea to the development of more effective drilling and blasting, more economical stoping methods, cheaper tramming and hoisting, economy of air, better sam-

pling, more complete extraction of ore, and a hundred other practical problems. Canadian mining methods are rapidly gaining a character of their own, due to the efforts of those members of our profession who are actuated by the modern spirit of research. The number of these researchers and experimenters is still, nevertheless, all too small, and the Canadian mining industry will profit immensely when a much larger proportion of its engineers will have been converted to the researcher's faith.

### ALBERTA COAL

The largest producer of coal among our provinces now is Alberta. Alberta also contains by far the largest part of Canada's store of fuel, and it is confidently predicted by students of practical economies that as settlement proceeds this central part of our country will support a preponderating part of the total population, not only agricultural but also industrial. At that time Alberta coal will come into its own as the most important material factor in life on the great plains. Meantime there is a superabundance of coal there, and it requires all the energy and ingenuity the coal operators can summon to find a market for the product of their mines.

In their efforts to widen the market in Canada for the coal of Alberta and eastern British Columbia, the coal operators are working not only for themselves, but for Canada. To them is due in part the notable increase of exports over imports during the last twelvemonth. The less coal we import from the United States, the better shall we be able to meet our obligations in that country.

The Mines Branch of the provincial government of Alberta and the Western Canada Fuel Association both are doing a pioneer work of education in Winnipeg, which is at present the principal Canadian market within reach of our western coal mines on which American coal still has a firm grip. Both have established offices in Winnipeg in charge of competent engineers, under whose direction a propaganda is being conducted that bids fair to win the market for the Canadian producer. Incidentally, it appears that the high-grade semi-anthracite coal from eastern British Columbia will not only replace Pennsylvania anthracite in Manitoba coal bins, but will also prove more economical than the high-grade briquetted fuel it is proposed to make from the lignite at Bienfait, Saskatchewan.

The process of education undertaken by the Alberta Mines Branch and the Western Canada Fuel Association is bound to be slow; but we are confident that it will be sure, for they have not only a worthy cause, but one that will provide profit both for the miner and the consumer. We print today an article by Mr. Howard C. Ritchie, which illustrates the way in which

American coal has become entrenched in the Winnipeg market. A little judicious publicity of facts such as those cited by Mr. Ritchie will, no doubt, hasten the time when the prejudice against the use of Canadian coal that persists in certain quarters will be overcome, and full advantage will be taken of the wonderful store of fuel with which Nature has endowed the prairies and the neighboring mountains.

### EDITORIAL NOTES

The promoter of a bogus company pretending to manufacture a new electric water heater has been sentenced in Toronto to seven years in the penitentiary. He was convicted of issuing a false prospectus and of appropriating for his own use funds obtained from stockholders. We look forward with interest to the time when similar prosecutions and convictions will disturb the operations of the promoters of fake mining companies that infest Toronto and other Canadian centres.

The threat of an embargo on the export of Pennsylvania coal to Canada will impress upon Canadians dependent upon that coal more strongly than ever the advisability of developing our own sources of domestic fuel. This reminds us that the Federal and Ontario governments have not yet taken steps to ensure that the peat plant at Alfred, Ontario, shall be used next summer to turn out the 10,000 tons or so of excellent fuel it is capable of producing. If no private concern should undertake to operate the plant, it is certainly incumbent upon our public servants in Ottawa and Toronto to see that we get that 10,000 tons of fuel.

### INVITATION FROM A CANDID BROKER

Dear Sir: — Your name was handed me today,  
And I was told that you are in the way  
Of dabbling quite a bit in mining shares  
Of mines in Porcupine and otherwheres.  
And so I thought I'd write at once to you  
And state my case without too much to-do.  
Our mine, the Guinea, has twelve hundred feet  
Of subterranean workings trim and neat.  
We have a first-class lot of shafts and stopes,  
Assorted winzes, raises, cross-cuts, hopes.  
The latter are our staple and our stay,  
For nearly all our ore is mined away.  
But gold mine shares just now are all the fashion;  
The public's eagerness amounts to passion.  
So if by that same passion you are gripped,  
We can supply you with delightful script.  
And, take my word, there'll be no future fuss—  
Your cheque will close the incident for us.

J. C. M.



# Some Mines Of The Slocan

SILVER-LEAD-ZINC PROPERTIES CONTINUE  
TO BE PRODUCTIVE AND NEW ORE  
SHOOTS ARE BEING CONSTANTLY  
FOUND

By ROBERT DUNN

At a recent convention of mining men from British Columbia and the State of Washington one of the representatives of Washington said that it was the silver of the Slocan District that laid the foundations of the now prosperous city of Spokane. Not only is this true but it is an equally incontestible fact that the mineral riches of this section continue to contribute materially to the well being of these parts of this Province and of the State of Washington to which it is tributary.

What is known as the Slocan Mining Division, approximately 600 square miles in extent, situated in a region so mountainous that if flattened it would occupy twice as much space, figures largely in the mining history of British Columbia and its importance by no means lies solely in its past achievements.

## *East and West Kootenays*

The Slocan is a part of the Kootenay country, from which, since the first discoveries there of silver-lead-zinc ores, has come the bulk of the lead and zinc mined in Canada. In East Kootenay the production has been maintained almost entirely by three or four mines, and at present there is but one large shipper, namely, the "Sullivan," operated by the Canadian Consolidated Mining and Smelting Co.

West Kootenay, besides possessing a number of large producers, has always had some small operators and the Slocan and adjacent country has been, so to speak, the home of the small operator and the leaser. The number of independent shippers, leasers, and prospectors operating in this area greatly exceeds similar activity in any other part of eastern British Columbia. This is accounted for by the richness of the ore, the ease with which it is won, and the comparatively good transportation facilities. While not the most important provincial mining division economically, the Slocan has a history that throws an interesting sidelight on mining operations in the oldest lode mining area of the Canadian West.

## *Slocan Still Going Strong*

A. G. Langley, government mining engineer resident at Revelstoke, has compiled some illuminating notes on the Slocan, it being his contention that the wealth of mineral

of the mountainous Kootenays, with their rivers, lakes, timber and other natural resources, is not appreciated. He maintains, too, that the "silvery" Slocan is apt to be passed by with the careless reflection that it has produced in the past, but that all that was worth while has been taken. Mr. Langley declares that this is not true of any part of the immense region over which he presides as engineer, and in a special sense it is not true of the Slocan. There, he states, the prospector and the leaser have a happy hunting ground. In abandoned workings he may find lenses of ore that pay handsomely. It has been and is being done. New ground also is being opened up with good results and Mr. Langley would have the mining man warned that the time is not yet for the placing of the Slocan in the discard.

In this mining division there are three chief towns, Sandon, Silverton and New Denver, around which the mines are located. Sandon is situated in the narrow V-shaped valley of Carpenter Creek and is a mining camp pure and simple. The other two places are beautifully placed on the shores of Slocan Lake and a stranger might easily mistake them for summer resorts or fruit ranching settlements. As a matter of fact, however, they still play an important role in western mining.

## *Geology and Ores*

Geographically the Slocan can be briefly described as an area underlain by sedimentary rocks of the Carboniferous period, consisting of carbonaceous slates, limestones and some quartzites. This series of rocks has been intruded by dykes and stocks originating from nearby batholithic masses of granite. The ore deposits occur as lenses in fissure veins in the sedimentaries, sometimes near the contact with porphyry dykes and occasionally in the porphyry itself. The large bulk of the ore mined has been won from veins carrying good widths of ore, while exceptionally high-grade ore has been extracted at handsome profits from some of the smaller veins. The most common ore is argentiferous galena, associated with zinc blende in a gangue of siderite, calcite and quartz. The silver values are associated with tetrahedrite. The average run of the ore carries about 2 ounces of silver to the unit percent of lead.

The topographical conditions lend themselves to cheap mining. The hillsides are steep and covered with sufficient



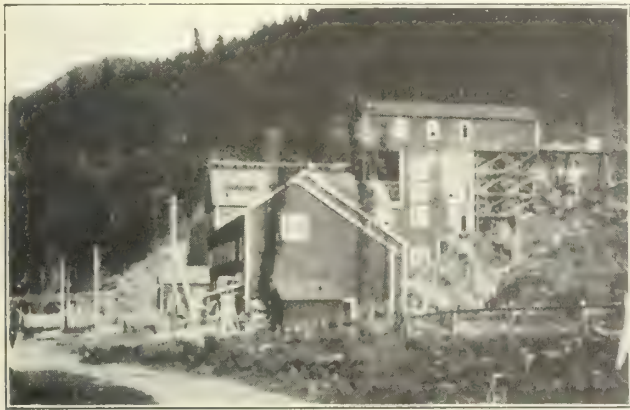
New Denver, B. C., on Slocan Lake in the heart of the productive Slocan silver-lead-zinc district



timber for all mining purposes. Small water-power sites are available quite generally, as is also water for concentrating. With very few exceptions the ore-bodies can be approached by adit tunnels. Most of the producing properties are within easy reach of railway or lake transportation. Aerial trams are extensively used and are by far the best means of conveying ore from the higher altitudes. There are good roads where necessary, and the mountain trails are unsurpassed in any part of the district. As to the climate, Mr. Langley is authority for the statement that it is moderate, the winter not being excessively cold, while the spring, summer and autumn are ideal. The huckleberries, which grow in profusion on the hillsides, are a decided boon to the prospectors and others working in the hills.

#### *Silver and Lead*

In the early nineties the discovery of high-grade ores started a stampede to the Slocan. Many fine properties were staked, among them being "Slocan Star," "Payne,"



Mill of the Standard Mine, Silverton, B. C., part of plant of one of largest producers in the Slocan district.

"Reco," "Rambler Cariboo," and "Whitewater." Production started about 1892, since which time it has fluctuated in a rather remarkable way, due partly to irregular market conditions and partly to the available ore supply at different periods. The values recovered have been principally in silver and lead, as the ores are essentially silver-lead ores with zinc blende as an accessory mineral, although there are a number of properties in which zinc blende predominates. No doubt there would have been a larger zinc production had marketing conditions been more favourable.

Although large tonnages of clean galena have been shipped, the bulk of the Slocan ore has to be concentrated in order to separate the lead from the zinc and make as near as possible a clean lead and a clean zinc product. The result has been the erection of numerous concentrators, and today the Slocan can boast of some of the most up-to-date plants for the treatment of silver-lead-zinc ore by gravity and oil flotation processes that exist on the continent.

#### *Slocan Star Mine*

The names of properties that have produced from time to time are legion, but it may be interesting to know a little about the ones that have been outstanding in the history of the Slocan.

The "Slocan Star" mine, which has the record of being one of the leading producers in the camp, was staked on October 17th, 1891, by Bruce White. Mining operations at this property have probably extended over a greater number of years than those of any of the other properties of this division, resulting in the extraction of a large tonnage of silver-lead-zinc ore. The Byron N. White Company, which was incorporated in 1892, acquired and operated the

property and after a period of productive activity became involved in costly and protracted litigation with the Star Mining & Milling Company. The case arose over the "extra lateral" rights of an adjoining claim named the "Rabbit's Paw." In 1911 R. S. Lennie, of Vancouver, amalgamated the conflicting interests and incorporated a company under the name of the Socan Star Mines Ltd., which company operated the property up to 1917.

In 1918 a re-organization was effected and the property was transferred to the Silversmith Mines Ltd. Under the management of R. H. Stewart a large shoot of ore was encountered on the 1000-foot level, the development of which in subsequent years has again established the property as the leading producer in the Slocan. The length of this ore-shoot is between 300 and 400 feet with an average stoping width of about 4 sets of timbers.

The ore fed to the mill runs about 26 ounces in silver, 10 per cent lead and 7 per cent zinc. In order to increase the milling efficiency, the Ivanhoe mill was bought, remodelled and an aerial tram built connecting it with the mine. To give an idea of what this property has accomplished in past years, the following figures are submitted, which do not include the production during the last few years, which will add considerably to the total. Over a period of twelve years the following ore and concentrates were produced: Tons of crude ore shipped, 17,870; gross value \$1,291,728, net value \$933,398. Tons of silver-lead concentrate shipped, 15,594; gross value \$1,229,461, net value \$896,804. Tons of zinc concentrate shipped; 3,445; gross value \$154,061; net value \$45,170. Total gross value \$2,675,430; total net value \$1,875,372.

#### *Payne, Rambler-Cariboo, Ruth, Standard*

The "Payne" was staked in 1891 and is reported as being the first discovery made in the Slocan. It was located by Eli Carpenter and John L. Seaton. Up to the end of 1904 this mine produced 50,000 tons of silver-lead averaging 68 per cent lead, and 120 ounces of silver per ton, together with 6000 tons of zinc blende, the aggregate value of which amounted to \$5,000,000. The dividends paid reached the grand total of \$1,438,000 or 28.76 per cent. This property has been lying idle for a number of years.

Among other steady producers the "Rambler-Cariboo" has a splendid record, has paid handsome dividends, and is still an active property.



Sandon, B. C., a typical Western mining town, situated in the midst of the mountains of the famous Slocan silver-lead-zinc district.



The "Ruff" mine near Sandon, after a period of productive activity, remained closed down for a number of years. Recently leasers cleaned out some of the old workings and were rewarded by striking some exceptionally fine ore. This year the property was acquired by a Vancouver syndicate and a small crew of men were put to work. The results so far obtained have been highly satisfactory.

The Standard mine, near Silverton, which has paid \$2,700,000 in dividends, was of more recent discovery than any of the properties above mentioned, and it was not until 1911 that it became an important producer. Credit is given to George H. Aylard for making the now famous mine out of this prospect. The surface showing was not considered in any way remarkable and those who examined it little thought that it would lead to the development of one of the largest ore-shoots ever discovered in the Slocan. Mr. Aylard, however, had other ideas and with dogged persistence and untiring energy developed a mine that turned out to be one of the largest and most profitable producers in this division. The main ore-shoot was developed between the No. 3 and No. 6 levels. On the No. 5 level it was 400 feet long and up to 20 feet in width of clean galena, besides an equal thickness of concentrating ore. The mine is still being worked and a considerable tonnage of zinc ore is being extracted by leasers.

#### *Queen Bess Mine*

The above mentioned properties are only a few out of a great number that have been developed in this division. There are others with just as good, if not better, records; in fact there is still one property that must be mentioned, for it demonstrates what some of the old abandoned mines may have in store for those who have the nerve to open them up and spend a little money on dead work. The mine in question is the Queen Bess. In about 1916 Clarence Cunningham acquired this property, which had been lying idle for a number of years. With a handful of men he opened up in a short time an exceptionally fine shoot of clean lead ore carrying high silver values. In about three years he made a profit of something like a million dollars.

Things are looking up in the Slocan just now, metal prices are good, smelting rates are lower, and for the first time in the history of British Columbia except during a short period of abnormal conditions produced by the war, zinc ore and concentrate are being accepted by the Trail smelter. The shipper receives payment for the zinc as well as for the silver values.

New discoveries are constantly being made and will continue to be made in the Slocan for many years to come, and taking all things into consideration we can look with confidence to the future of this richly mineralized area.

In view of the present and proposed activities in the manufacture of asbestos in Canada, the use of asbestos-coated metal for roofs and siding has a renewed interest.

The steel base is covered with a mixture of asphaltic material and asbestos fibres, which protect the metal against any ordinary corrosive action. Though the asphalt is combustible, it will not ignite unless it is subjected to an intense heat over a considerable area.

The tonnage of ores passing through the Suez Canal in 1922 was approximately 1,450,000 tons, as compared with 1,560,000 tons in 1913, the record year. Manganese ore, mainly from India, comprises the major part of this tonnage. Zinc ore shipments were about 200,000 tons, principally from Australia.

## LETTERS FROM READERS

### *Madagascar Graphite of Good Quality*

To the Editor,

Canadian Mining Journal.

Sir:—In the December 8th, issue of the *Canadian Mining Journal* you published an article entitled "Canadian Graphite to Lead in the World's Market" by Mr. H. P. H. Brumell, in which the statement was made that the Madagascar graphite has been found unsatisfactory for the manufacture of crucibles, the most important of all uses to which graphite is put.

As this information was contrary to any we had on our files, we made further enquiries and have received, through one of the Government Trade Commissioners, a statement from the Imperial Mineral Resources Bureau, London, S. W., to the effect that they have no information that Madagascar graphite is unsuitable for crucibles, but that on the contrary, to their knowledge, it is being used in preference to Ceylon graphite owing to its better quality and grade.

As the dissemination of information of this kind is detrimental to the development of Canadian resources, we shall appreciate it very much if you will have this statement corrected.

F. C. C. LYNCH.

Natural Resources Intelligence  
Service, Ottawa.

## LIME IN UNITED STATES IN 1922

About 3,528,000 short tons of lime, valued at \$33,057,000, was sold in the United States, including Hawaii and Porto Rico, in 1922, according to an estimate made by the United States Geological Survey, from reports received from the principal producers. This quantity is more than 39 per cent. greater than that sold in 1921 and only 1 per cent less than that sold in 1920. The average value per ton in 1922 is estimated at \$9.37. In 1921 it was \$8.83 and in 1920 it was \$10.52.

The sales of hydrated lime in the United States in 1922 were estimated at 1,125,300 short tons, an increase of 42 per cent. over those in 1921 and the largest yet reported. Of the 31 States that reported an output of hydrated lime in 1922 only three showed a decrease. The estimated value of the hydrated lime sold in 1922 was \$10,850,000, an average value per ton of \$9.64. The average value in 1921 was \$9.36. The demand for lime was obviously better in 1922 than in 1921, but producers report that the market was very irregular. Prices fluctuated greatly throughout the year, but showed a decided downward trend. Lime for construction undoubtedly made the largest increase in production, and chemical lime also increased appreciably, but it is doubtful whether agricultural lime made any increase whatever.

Chemical lime showed decided improvement in demand during the year, according to the manufacturers of lime of this class, but not so decided an improvement as construction lime. Though increases of 5 to 70 per cent and exceptionally of 125 and 160 per cent were reported there were more reports of fair demand and about the same demand as in 1921 than in the reports for construction lime. The last half of the year appeared to be a time of great improvement in the chemical lime trade 1922. The sales of refractory lime (dead-burned dolomite), used in patching and lining basic open hearth furnaces, increased from 107,664 short tons in 1921 to over 300,000 tons in 1922.



# Mine Accidents in Nova Scotia During 1922

INCREASED ACCIDENT RATE DUE IN PART TO  
NEGLIGENCE OF MINERS—LAWS AND  
PREVENTIVE MEASURES GOOD

by JOHN MOFFATT

The mining industry of Nova Scotia has had a bad year for accidents. The figures for the whole of 1922 are not yet available, but Cape Breton's fatal accidents were much more numerous than during 1921. In the face of so much work done and money spent in 1922 to avoid accidents, it is not encouraging to have to report an increased rate. But while the individual fatalities were greater, it is cause for thankfulness that our collieries have not been visited by catastrophies such as mine explosions. It requires constant vigilance to prevent these, for there is scarcely any coal mine of any depth, that has not all the elements of an explosion, if these are permitted to exist and get together. This is especially true of the larger collieries of Nova Scotia. Apart from fatal accidents the non-fatal were one per cent. less than in 1921.

## *Mine Accidents in the United States*

There seem to come periods when, do what we will, the accident rate keeps climbing up. The United States coal industry had had such a period in 1922 as well as Canada. President Rush N. Hosler, recently addressing the Coal Mining Institute of America on the dangers of mining, said that "one in every five employees in and around the mines of Pennsylvania is injured every year severely enough to require medical attention, this injury being anything from a slight wound requiring a surgical dressing to the loss of life. One employee in every two hundred and fifty engaged in haulage is killed each year and annually one brakeman and one trip rider in every one hundred and twenty engaged in that work likewise is killed." When made in this way, such a statement is most startling and cannot fail to rouse mining men and cause them to take a more active interest in mining accidents, and their causes.

## *Haulage Accidents One In Six*

Out of about fifteen hundred men on the haulage systems of Cape Breton collieries, five men lost their lives during 1922. This is away above the average of past years, and it serves to emphasize the danger to a class of men who are either entering on life or in the prime of it. In all two hundred and forty three accidents occurred in this class during the year, or one in every six. The cause of these accidents arises from narrow, unlighted roadways, from the high speed of trips and from the still higher speed of mine cars breaking away from haulage ropes and rushing down heavy grades. The darkness of the mine conceals the oncoming box, and its noise is usually the first indication that a breakaway has occurred. It may be then too late to escape. Derailing switches, stop blocks, and other devices are used against such occasions but with accelerated speed a run-away trip brushes these aside or jumps over them, keeping on its course until brought up at the bottom of a deep or headway.

## *Accidents at the Face*

Accidents from the falls of rock and coal head the list at 333, but although numerically higher they are, according to the number of men employed less than that of the class handling mine cars. It is probably here that the largest reduction could be made, as it is very often owing to too great haste to get a large amount of coal filled (as wages

depend on tonnage sent up) or to faulty judgment that many of these accidents occur.

The labor unrest of the past few years has also contributed to the number of accidents. Mine officials report that it is difficult to get the miner to keep his spraggs up against the coal face. The workmen fail to see that the violation of laws made for their own protection, and lax discipline on the part of mine officials who fear friction from too strict enforcement of the law, reacts on themselves by an increase in the number of accidents. It is the common opinion of those who have made inquiry into the causes of accidents that hearty co-operation between the mine officials and the miners would greatly reduce them.

## *First-Aid Stations not Sufficiently Used*

Another serious feature to be noted during the year was the large increase of septic cases. With well equipped first aid stations at each colliery there should have been a large decrease in this class of accident and also in the length of time the septic cases should have taken to heal. But it was otherwise.

Alberta miners last year applied to the Government for the establishment of first-aid stations at all collieries. But if, when these are established, workmen will not use them, then compensation should be withheld from all, both there and here, who will not take the means at hand to prevent a cut or small wound from turning to blood poisoning. If coal companies are by law compelled to build first-aid stations and equip them, the same law should have something to say about the miner, who, because he refuses or neglects to be treated there, permits a slight accident to develop into a serious state and so prolongs the time of compensation.

When we take into account the time and money spent in trying to prevent accidents, and in investigating them after they do occur, we fear that results are not what they should be. The larger coal companies maintain a safety department with a staff of highly trained inspectors who enter the mine daily for the purpose of detecting dangerous conditions, places and practices and bring these to the notice of the busy mine officials. These men investigate all accidents and report on them. In addition the Compensation and the General Superintendent's Departments scrutinize the causes of all accidents. There is no let-up, no lying down on the job, and the coal companies of Nova Scotia are determined that there shall be none. So far as is humanly possible the staffs of our coal mines are preventing accidents. It is up to the miners to co-operate.

A new coal field, which it is reported will add enormously to Great Britain's coal wealth, is being opened in the Dukeries district of Northamptonshire. Six pit shafts are to be sunk, some of which have been commenced. A new company has been formed with an initial capital of £500,000 to develop coal deposits in Kent.

The prospecting around Guebwiller, near Mulhausen, Haut-Rhin, France, for petroleum is being carried on very actively and definite results are expected soon. A new oil sand has been found near the original well and drilling will be started at once.



## THE UPPER CRITICAL SCORE\*

FIRST MEASUREMENT OF THE HIGHER AS WELL AS THE LOWER LIMITS OF INTELLIGENCE, BEYOND WHICH IT IS NOT PROFITABLE TO EMPLOY APPLICANTS FOR A PARTICULAR TYPE OF JOB

A rough measure of the brightness, or mental alertness, of an applicant, by means of a standardized mental test, has long been recognized as one of many possible sources of information for use in personnel selection. Early tentative attempts to use this test technique in employment procedure, sometimes met with anomalous results because it was not recognized that, for some types of employment at least, an applicant may be too intelligent.

In affiliation with the Carnegie Institute of Technology, Pittsburgh, a group of twenty-seven companies of national scope established, in June, 1916, the Bureau of Salesmanship Research, now the Bureau of Personal Research. This Bureau was to pool the experience of the co-operators to evaluate their current procedures, and to devise and try out new ways of selecting and developing salesmen. The first year's work, under Walter Dill Scott, issued in a volume of "Aids in Selecting Salesmen," including an improved personal history record, or application form, a model letter of reference to former employers, a guide to interviewing which helped the interviewer to focus his attention on essential traits and to record his judgments quantitatively,\*\* and a set of five psychological tests with full directions for giving and scoring.

Among these tests was a group intelligence examination, a forerunner of Army Alpha. It was given to various groups of salesmen and sales applicants, and their scores were checked against actual success as measured by amount of sales. Among the men so examined, was a group of 40 salesmen for a food products company. To the dismay of the research workers, when the intelligence test scores were compared with the men's sales-production records, the correlation was almost zero. This appeared to be a severe indictment of the test as a measure of intelligence.

Then came the War, and with it a vast experience in personnel classification and intelligence examining. The psychological tests proved their worth in the Army as indicators of mental alertness. So when C. S. Yoakum, with this background of Army experience, in 1919, assumed direction of the Bureau of Personnel Research, he knew that the intelligence test methods were valid, and he sought another explanation of the riddle in the findings of 1916. Taking the same data, he computed the correlation between test scores and length of experience with the company. The correlation was not zero. It was negative, —40. The brighter the salesman, the quicker, as a general rule, he left the employ of that concern.

Yoakum repeated the experiment with 76 salesmen of this same company, using the best available adult intelligence examination. The correlation of test scores and length of experience was —46. A job analysis revealed that the work was largely of the routine, order-taking sort. The pay was not large. Chances of promotion were slight. Only the more stolid men were content to remain long enough to get valuable experience and build up a creditable sales record.

Examining the intelligence scores again, it was apparent that there is an upper limit as well as an anticipated lower limit. Within this range, the chances are large, that an applicant for a position with this concern will make good. Below this zone he will probably fail for lack of ability. Above it, the probabilities are are that he will not remain long enough to learn his work thoroughly and make a good showing. The psychological test had, after all, been a valid measure of mental alertness. The need had been for a determination of its range of utility.

This range varies for different kinds of salesmen, as well as for different occupations. In many jobs it has been shown that there is no upper limit to the optimal intelligence score; but studies of policemen, salesmen, and many types of operatives and clerical workers, where the task is essentially routine, have shown how necessary it is to keep an eye on the upper as well as the lower critical score. Research on the utility of psychological methods in employment and placement is but one of many scientific approaches to problems of industrial personnel. Taken as a whole, the scientific study of the human factor may prove as important to the next era of industrial progress as research in the physical sciences has proven hitherto.

## U. S. BUREAU OF STANDARDS

During the past year the activities of the Bureau of Standards at Washington have included numerous investigations of interest to the metallurgist as reported by the Director in the *Journal of the Franklin Institute*. Among these are a study of methods for the analysis of gases in metals, the determination of thermal stresses in car wheels, and the rust resistance of alloy steel. Particularly important work has been accomplished by the research associates in metallurgy sent to the Bureau by various manufacturers.

As in other work in connection with ceramics, the practical problems have been particularly stressed. Tests have been conducted of tableware and window glass, the best types of American clays to use in paper-making have been determined, and the comparative value of various ceramic materials for different purposes has been investigated.

The making of optical glass in the Bureau's laboratory has been carried on very successfully, a great deal of first class glass in the form of lens blanks and finished lenses having been supplied to other branches of the government, particularly to the Navy Department.

Specifications are being prepared for refractories, such as the fire brick in boiler furnaces, and work is under way which will lead to the improvement of enamelled metal products.

During 1922 the production of beehive coke in the United States increased 45 per cent. over 1921, and by-product coke, 44 per cent. The relative quantities, though differed much—8,033,000 tons of beehive coke and 28,493,000 tons by-product. The recoveries of by-products were approximately as follows: tar, 365,000,000 gallons; ammonium sulphate, 964,000,000 pounds; gas 447,000,000 M. cubic feet; crude light oil, 111,000,000 gallons.

The mill of the Modder Deep mine on the 'Rand, South Africa, is to have an oil flotation plant to concentrate the sulphides from its current sand product. It is expected that this addition to the mill will give a net profit of 8d. per ton of ore.

\*Research Narrative No. 49, by Dr. W. V. Bingham, Director of Co-operative Research, Carnegie Institute of Technology.

\*\*This form later became the Scott Rating Scale of the Army.



# Re-Tinting the Rainbow

By ALEXANDER GRAY

Three outstanding events of past week are: First, the announcement of Mr. Curry that the Ontario Government bill for the regulation of the sale of securities is designed, principally, "to insure the proceeds of stock sales being used to develop properties instead of being frittered away in promotion, so as to see that a company gets away with a reasonable chance of success, but without guaranteeing success." Second, that there is to be a "wild scramble" for Labradorean gold, and 2,000 areas of 320 acres each have been allotted by Newfoundland. Third, that Americans have obtained a concession to work the Amur gold fields, the Soviet Government to have 18 per cent. of the gold recovered for thirty-five years and the plant to revert to the Government at the end of that time.

## *The Proposed Law*

Taking Mr. Curry at his word, we are to have a speculative revolution. Promoters' perquisites are to be ruthlessly dealt with; "fifty-fifty" brokerages are to cease; a greater percentage of the capital raised by appeals to the public is to go toward exploration and development.

It is not intimated whether the "Commissioner" to be created by the Sales of Securities Act is to have discretion in limiting capitalizations or in the disposition of vendor considerations. No restrictions, as things are constituted, are imposed upon initial nominal issues, for which the usual registration fees will be charged. But how the law-givers are going to prevent promotion and distribution costs from being diverted, is something the most circumspect governments have not yet been able to provide for. Stipulations that shares shall not be sold except at fixed prices and that commissions shall be so much never have availed where it is possible to include all these in vendor considerations, or by other means familiar to promoters. Agreements as between original owners, intermediaries, and incoming interests are susceptible to so many diversions, it will take more than animadversions by the "Commissioner" to give companies granted an official status, "without recommendation" a "reasonable chance of success". Human expectations as capitalized in ordinary mining ventures require a restraint that mere legislation cannot impose. Sanction without certification is in the nature of passive resistance to established practice.

## *Bushels of Gold!*

No less emergent is the impending stampede to Labrador. The Newfoundland authorities have not affirmed or denied the existence of "another Klondike". They are reported to have granted rights to over 640,000 acres of what may or may not be placer ground; and large numbers "are being held back from this latest Eldorado only by the rigors of a Labrador winter." Wm. H. Taylor, of Newfoundland, is quoted in New York as saying that "the anticipated boom has led to speculation in claims." This hardly expresses the situation. At least one Montreal company had \$150,000 in its treasury two weeks ago. Available space on vessels chartered has been exhausted. Expeditions are being outfitted. More schooners are being built. The "scramble" for the "gamble" has reached proportions not generally understood, unmindful of the adverse features of the speculative game.

Why Newfoundland authorities have permitted flotations and flamboyant statements to go broadcast unchallenged, before the areas have been tested, is not commented on by the daily press. The pot of gold is at the end of the rainbow, in contact with the aurora borealis, according to those who have made the public pay for what may be a most distressing experience.

Without minimizing the profits derivable from "another Klondike", Labrador conditions are decidedly different and grab samples are not sufficient warrant for what has happened. When the Fort Norman "gusher" stirred up the adventurous, the Dominion Government took the precaution to prevent "blanketing" and to see to it that those unprepared for a sojourn in the sub-Arctic were turned back. So far as known, nothing of this sort is arranged as regards Labrador. How much gold-bearing gravel there is, Newfoundland does not know, nor even if there is any. Town lots in the suburbs of the Hudson Bay Post at York House may be a sounder investment than a great deal of what is being dealt with on a "co-operative" basis — \$200 down and the balance in placer gold that may not exist.

Of course comment is unavailing where the allurements are so transcendent and verification of them must await actual examination and results. However, the risk is too one-sided, and Newfoundland officials are not without responsibility. Not for an instant will any well-meaning person attempt to discredit any bona fide development of the kind. It may be a reversion windfall to Newfoundland, but if the "retreat from Moscow" is duplicated, who is going to bear the blame and punish promoters — if they are punishable?

## *Russian Gold*

This brings into this discussion of passing events the American adventure on the Amur, through the favor of the Soviet Government of Russia. For thirty-five years the concessionaires are to pay 18 per cent. of the gold recovered. Provision that plant will go to the Government at the expiration of the period will naturally negative itself; for the chances are there will be no junk dealers in the vicinity at that time. It may be perfectly true, as Mr. Tyrrell told an audience the other day, that the pre-Cambrian formation probably extends into the Polar regions; but it will be some time before prospectuses having to do with those are given display space in the press. Besides, 18 per cent. of the net is an impost few gold ventures could survive, unless the gold is as plentiful as it is alleged to be in Labrador, whither Canadians, Americans and Australians, according to Mr. Taylor, are to go "flocking" — perhaps with wool already shorn.

That there is gold in Labrador and in the Amur country, is not questioned. Wherever glacial action did not complete the denudation, there is likely to be alluvial gold. To find it will require more than light lunches and a change of socks and moccasins. As for the Amur, every decade or two Russian riches have bestirred London, and if New York avails of the latest concession it will be just as well to submit to the most stringent regulations Mr. Raney can impose. Those who prefer the rainbow tips to colors close at hand may chase them if they will; but they have a de-



oddly futuristic appearance to the majority of art critics.

\* \* \*

640,000 acres of Nuggets! Labrador the Golden! Russian Rivers Running over Beds of the Precious Metal! and no Mr. Raney to shepherd the gathering flocks!

### BOOK REVIEWS

**BRIQUETTING** — by Albert L. Stillman — Chemical Publishing Co., Scranton, Pa. — 466 pages, fully illustrated.

This treatise on the principles and practice of briquetting is the first attempt by a writer in English to compile and arrange the mass of information now available about this increasingly important industrial operation. A vast amount of fuel is now briquetted annually, such as the culm or slack of anthracite and bituminous coal; lignite; brown coal and peat in Europe; flue dust from blast furnaces; fine ore of many kinds, such as iron and zinc concentrates; scrap metal such as steel, iron, brass and aluminium, and even sawdust for fuel. Briquetting overlaps of course, with operations such as sintering, which are not treated in this volume.

After a short discussion of the raw materials to be treated, the various types of briquetting presses are described. The application of these devices in practice is then described, particular attention being paid to plants in the United States and Canada.

The volume illustrates the modern tendency to devise ways and means of using what were formerly waste products. The material collected by the author is excellent, and we hope that in a future edition he will be able to present it with less evidence of hurried publication.

**ELEMENTS OF MINING**, by George J. Young—McGraw-Hill Book Co., 370 Seventh Ave., New York—671 pages and 282 illustrations—Price \$6.00.

This book was first published in 1916, and the 1923 edition is completely revised and in part rewritten. One's first impression of the book is that its field is so broad that the matter must be so elementary as to be uninteresting to any but the beginner. A further acquaintance demonstrates, however, the fact that Mr. Young has succeeded in presenting not only information but live ideas on a very wide range of subjects, and withal has preserved a balance among the various sections of his subject matter that is rare in general text books written on this continent.

There is well illustrated in this book a tendency among technical writers that is, happily, rapidly becoming the vogue. Mr. Young's statements are, in the main and of necessity, couched in general terms without the support of the substantiating data. But he has interposed frequently and with unusual discretion actual data, in such a way as to lighten rather than to burden the text. Another valuable tendency illustrated here is the inclusion in this technical treatise of a discussion of the values of ores, relative as well as absolute, and their sale, the cost of typical mining operations, and the fundamentals of mine organization and operation and accounting.

The illustrating of the book is unusually well conceived. It contains little but diagrams, and each of these is made to serve a distinct and useful purpose. The perspective diagrams illustrating stopping methods are especially good.

Mr. Young's book in its revised form merits the attention not only of those who are commencing the study of mining but also of the vast majority of practicing mining engineers whose preoccupation in special phases makes advisable an antidote in the form of a good, general treatise.

### HOW TO FIRE SUBSTITUTE FUELS

Many a householder who has experienced great difficulty in trying to burn the substitute fuels thrust upon him this winter will welcome a pamphlet just issued by authority of the Dominion Fuel Board telling him just how to proceed to get the best results. The Mines Branch at Ottawa has been experimenting for months with these auxiliary fuels in ordinary domestic furnaces, and the pamphlet now issued tells what they have found out. The fuels tried out were soft coal, pea-size anthracite, gas coke, 72-hour nut coke, Welsh anthracite and peat.

A feature of the experiments was that the use of two of these fuels together often gave better results than one used alone. Complete directions are given for building the fire, for replenishing it and for regulating the drafts. Chemical analyses are also published of each fuel, showing its comparative heating value, ash content and other constituents.

Particular interest attaches to the directions for using soft or bituminous coal; for, the Canadian householder, in the great majority of cases may find it necessary to use soft coal for the remainder of this winter. This fuel, the pamphlet points out, is differentiated from anthracite in having a much higher percentage of volatile or gaseous material. Its heating value, however, is nearly 10 per cent greater than that of anthracite, but it must be fired differently from the latter to get best results.

Care must be taken to see that the gases that come off are burned. In putting on more fuel, part of the old fire must be left uncovered to ignite these gases and the grid in the fire door must be left open to supply air so that the gases will be burned. A soft coal fire also has to be poked more to break up the caked fuel mass in order to permit of complete combustion. The unconsumed gases deposit a layer of soot on the interior of the furnaces and the flues, and this should be cleaned off daily to get the best heating results.

The pamphlet is written in clear non-technical language, and should be read carefully by every householder. It is being widely circulated and coal-dealers are being given a supply for free distribution to their customers. Copies can also be obtained on application to the Department of Mines, Ottawa.

Last year there were launched in Britain 1,031,081 tons of merchant vessels, which is 41.8 per cent. of the world's total, as compared with 58 per cent. in 1913. The most noticeable change during the year was in the United States, whose new tonnage fell from over a million tons in 1921 to 119,138 tons in 1922. Canada built only 17,012 tons, accounted for mainly by one large steamer launched at Port Arthur.

The Canadian Ingersoll-Rand Co. now have available for distribution circulars describing the mechanism and use of their Little Tugger Hoist (No. 4056); the IRLP Shank and Bit Punch (No. 4055-C); the "Ingersoll-Rand" Air-line Lubricator (No. K-218); the "DriAir" automatic water trap; and the Cameron centrifugal boiler feed pumps (No. 7056-C). These circulars can be had on application by any wishing them.



# Alberta Coal in Winnipeg

PUBLIC SCHOOL BOARD BUYS POORER IMPORTED COAL  
AT HIGHER PRICE

By Howard C. Ritchie \*

Early in October, the Directors of the British Empire Exhibition, which is to be held in Wembley, England, next summer, met for the purpose of arranging for the purchase of necessary supplies, and very much to the surprise of the Canadians on the Board, it was announced that timber and flour from foreign countries would be imported. Mr. Grant Morden asked why Canadian flour and timber would not be bought, and pointed out that the purpose of the Exhibition was to promote better trade relations within the Empire. The Manager explained that Canada could not produce good bread from its own wheat, and as for timber, it was impossible to get timber in Canada suitable for building fences at Wembley. To support his contention, he passed around a sample of what he described as a "very inferior sample of Canadian Spruce." As a protest against this absurd libel on good Canadian products, Messrs. Robert Donald and Grant Morden resigned from the Board. The Canadian papers from coast to coast used columns of space to prove our wheat was second to none, and our timber was not only suitable for building fences, but might even be used for the construction of houses. The hue and cry raised over this incident was heard throughout the Empire and resignations and explanations followed as a matter of course.

About this time the Winnipeg Public School Board awarded the contracts for supplying coal to the schools. 7,200 tons of American coal were bought for approximately \$95,250.00 and 950 tons of Canadian coal for \$7,820.00. Nothing was said in the Press about patronizing foreign mines when Canadian mines were idle for want of business. None of the School Trustees resigned as a protest against these purchases, and the public assumed the School Board had bought in the best market. But did they?

## A Libel on Canadian Coal

This article will deal with all tenders received, and try to prove, to the satisfaction of the reader, that the rate-payers of Winnipeg are very much out of pocket by these purchases of American coal, and that the action of the Board in ignoring the majority of tenders for Canadian coal is a serious libel on our coal industry which will prejudice other buyers against our good coals. It is unfortunate that the subject cannot be dealt with briefly; but there are so many figures to be considered, and the arguments used to prove that Canadian coal was worthless for this purpose are so nearly unique that in justice to the bidders, (and incidentally the School Board) it is necessary to submit a lengthy analysis of the subject.

The following is a list of all the offers of Canadian coal received, and some of the prices asked:

|                     | Per Ton |            |
|---------------------|---------|------------|
|                     | \$11.75 | to \$12.80 |
| Cadomin .....       | 12.45   | 13.35      |
| Michel .....        | 9.00    | 10.10      |
| Pembina .....       | 7.90    | 8.50       |
| Coal Valley .....   | 9.90    | 10.85      |
| Corbin .....        | 11.00   |            |
| McLeod River .....  | 10.85   | 11.90      |
| International ..... |         |            |

|                          | Per Ton |            |               |
|--------------------------|---------|------------|---------------|
|                          | \$10.85 | to \$11.95 | "Not desired" |
| Bellevue .....           | 10.50   | 12.25      | " "           |
| Greenhill .....          | 12.35   | 12.45      | " "           |
| Hillcrest .....          | 12.15   | 12.45      | " "           |
| Luscar .....             | 11.55   | 11.95      | " "           |
| Mohawk .....             | 12.50   |            | " "           |
| Coal Creek .....         | 11.25   | 12.55      | " "           |
| McGillivary Creek .....  | 12.25   |            | " "           |
| Foothills .....          | 9.00    |            | " "           |
| Black Diamond .....      | 7.80    | 9.00       | " "           |
| Dinant .....             | 8.50    | 10.20      | " "           |
| Bush Mine .....          | 8.25    |            | " "           |
| Atlas .....              | 10.20   | 11.00      | " "           |
| Sterling .....           | 11.00   | 11.70      | " "           |
| Minehead .....           | 7.45    | 9.20       | " "           |
| Rosedeer .....           | 9.15    |            | " "           |
| Lakeside .....           | 9.55    |            | " "           |
| Monarch .....            | 9.45    |            | " "           |
| Elgin .....              | 8.50    |            | " "           |
| Kneehills .....          | 6.50    | 9.00       | " "           |
| Hygrade .....            | 7.20    |            | " "           |
| Western Gem .....        | 8.50    |            | " "           |
| Western Commercial ..... |         |            | " "           |

Thirty Canadian coals, representing almost every field in Western Canada, were offered at prices varying from \$6.50 for Hygrade to \$13.35 for Michel, delivered in the school basements.

The tenders were turned over to the Chief Operating Engineer of the School Board for tabulation and to calculate the relative values of the various coals at the prices asked. Col. Mitchell, Commissioner of Building and Supplies, has kindly furnished a copy of the report of the Chief Engineer, and the figures quoted here are taken from that report.

## Canadian Coal Used Elsewhere

Of the thirty Canadian coals offered, twenty-three of them were marked "Not desired" and were therefore not considered when awarding the contracts. Why they were "not desired" is not stated, but it is assumed that in the opinion of the Chief Engineer they were "inferior Canadian coals, not suitable for heating school buildings". In this list are several varieties that are commonly supposed to be good coal, and have been purchased by School Boards in other cities for years. Luscar coal is being used to heat the schools and collegiates of Moose Jaw this season. The Secretary of the Board writes that it gives "complete satisfaction to the Trustees." McGillivary Creek coal is being used in the Calgary schools and has been found "very satisfactory." The Regina School Board has used Bellevue, Hillcrest, Greenhill and McGillivary Creek coals and they have all given "splendid satisfaction." The Brandon schools have been heated with Canadian coal for several years and they have "proved more economical than American coal."

Yet none of these coals were even considered by the Winnipeg Public School Board as being worthy of consideration. It was not a matter of price or quality. They were simply not allowed to compete for the contracts. This liberal application of the blue pencil reduced the competition to the seven Canadian coals at the head of the list. Three of these were purchased in small quantities for "test purposes," so they were safely disposed of. 350 tons of Pembina were purchased

\* Secretary of the Western Canada Fuel Association.



for use in Spencer boilers. In the past, American anthracite was used for this purpose, but it was found that Pembina was easier to handle and proved more economical, so those school caretakers who asked for Pembina were supplied with it, although we understand some schools with Spencers are still using an-

where they are subjected to much more severe tests than the heating of school buildings. Cadomin, International and Michel were given a value below the analyses submitted with the tenders. The Chief Operating Engineer's tabulation of the steam coal tenders is here given:

| Mine                   | Grade | Stated heat value | Heat value allowed | Price   | Comparative value                                |
|------------------------|-------|-------------------|--------------------|---------|--------------------------------------------------|
| Pembina .. . . .       | M. R. | 14,300            | 14,200             | \$12.95 | Lowest tender on Pocohontas used as base figure. |
| Pocohontas .. . . .    | M. R. | 14,200            | 14,200             | \$13.25 | \$12.95                                          |
| Youghiogheny .. . . .  | M. R. | not stated        | 13,700             | \$12.55 | \$12.50                                          |
| Cadomin .. . . .       | M. R. | 13,640            | 12,250             | \$12.05 | \$11.22                                          |
| International .. . . . | M. R. | 12,500            | 11,620             | \$11.90 | \$10.60                                          |
| Michel .. . . .        | M. R. | 14,500            | 13,500             | \$12.45 | \$12.30                                          |
| Pocohontas .. . . .    | Slack | 14,300            | 14,300             | \$12.50 | \$12.50                                          |

NOTE: — Tenders on all other kinds of Slack coal were rejected, so no comparisons were made on this grade and a contract amounting to about \$25,000.00 was given without any competition from any other variety of coal.

anthracite, which costs almost twice as much and gives no better satisfaction.

### Requirement of Tender

This left three Canadian coals to compete with two American coals, so it will not be hard to examine the bids carefully.

The Board asked for tenders for supplying steam coal equal in heat value units to 5,200 tons of West Virginia Pocohontas mine run coal; also steam coal screenings equal in heat value units to 2,000 tons of West Virginia Pocohontas screenings; also coal equal in heat value units to 180 tons of Youghiogheny mine run coal.

The specifications read in part as follows: "For the purpose of comparison, each party tendering must send, enclosed with tender, an analysis made by the Milton Hersey Co. Ltd., or other duly qualified analytical chemist, showing the constituent parts, and number of heat units in coal it is proposed to supply, and the coal which is selected must approximate such analysis when delivery is made at the schools. The coal when being delivered will be subject to inspection by the Chief Operating Engineer, who may have it analysed from time to time by the Milton Hersey Co. Ltd., and should such tests show results different in an appreciable degree from that sent in with the tender, the Board may cancel the contract, or make such deductions in the price as is equivalent to the reduced value of the coal."

There is nothing definite in the above specifications, as the bidder is not asked to guarantee anything for the coal supplied. He is not required to deliver coal up to a certain standard, but only "approximately" close to the analysis which is submitted with the tender. What the term "approximately" means in this case is something the contractor must depend upon the Chief Operating Engineer to define. The writer asked an official of the Board what latitude would be allowed in case the coal supplied did not test as high as the analysis submitted with the tender. The reply was that if it were a thousand B. T. U. lower he supposed there would be a deduction made from the invoice, but there was no stated variation provided for.

The bidders who offered Canadian coal enclosed their analysis as asked for, and these analyses were either ignored or the coal was listed as "not desired." The following coking steam coals were rejected as "not desired": Bellevue, Greenhill, Hillcrest, McGillivray Creek, Luscar, Mohawk and Coal Creek. All these coals have been used by the railways for years.

### Canadian Coal Rejected

Michel was guaranteed to contain not less than 13,500 British Thermal Units per pound, and therefore subject to severe penalties if inferior coal were delivered, so the Chief Engineer could not very well value it below this figure. Nothing was guaranteed for any of the American coals, and the analyses enclosed with the tenders were accepted at their full value. The unfairness of accepting these analyses and rejecting the analyses of the Canadian coals is apparent, especially when it is remembered that all American coals offered had been mined for over a year, and are much inferior to fresh mined coal.

The contracts awarded were:

3,000 tons of Pocohontas Mine Run \$12.95 per ton  
2,200 tons of Pocohontas Mine Run \$13.25 per ton  
2,000 tons of Pocohontas Mine Run \$12.50 per ton  
180 tons Youghiogheny Mine Run \$12.55 per ton  
3,000 tons of Pocohontas were bought at the base price of \$12.95. Competition for the next contract of 2,200 tons was narrowed to Pocohontas at \$13.25, which was thirty cents above the base, and Michel at \$12.45, which was fifteen cents above the base price. The Michel was guaranteed to contain not less than the number of B. T. U.'s used as a basis of comparison, yet the contract was awarded to the foreign coal at fifteen cents more per ton than the relative values as calculated by the Chief Operating Engineer.

The Commissioner of Buildings and Supplies said the Board was not prejudiced against Canadian coals, and would award the contracts to the Canadian product if their prices were lower than that of the foreign coals. In spite of this we find that practically all the business went to the other side of the line, when after eliminating most of the Canadian bids, and rating two of the others at ridiculously low values, their own figures showed that Michel was entitled to at least 2,200 tons. It might seem an error, but for the fact that this Association wrote the Commissioner on Nov. 3rd pointing out the injustice of ignoring the tender for Michel when it was admitted to be lower than its American competitor. We are informed this letter was read at a meeting of the Supply Committee before the contracts were signed, but no action was taken to reconsider the matter and our letter is still unanswered.

### Tests of Canadian Coals

All the figures given in this article so far have been quoted from the report of the Chief Operating Engineer



presented to the Public School Board when the tenders were being considered, and are grossly unfair to those firms who were offering Canadian coals, so we are appending reports of tests and analyses from reputable sources to prove our contention.

**Cadomin.**—The Milton Hersey Co., Ltd., wrote under date of Sept. 25, 1922. "We have obtained a representative sample from your Cadomin coal stock piles which analyses as follows:

B. T. U. per pound on sample as received... 13,440  
Total Combustible Matter . . . . . 84.65%

The above sample as taken, contained 1.75% of moisture (rain) and the analysis of an air dried sample is;

B. T. U. per pound on air dried sample . . . 13,640  
Total Combustible Matter . . . . . 86.40%

The School Board allowed this coal a B. T. U. content of 12,225, thereby decreasing the cash value \$1.22 per ton, which was barely enough to kill the tender.

**International.**—The Milton Hersey Co., Ltd., reported on Dec. 13th, 1922 that they had taken a representative sample of this coal from the yards of J. C. McNabb & Son, Ltd. which analysed as follows:

B. T. U. per pound on sample as received . . . 12,307  
Total Combustible Matter . . . . . 82.40%

This coal was allowed a heating value of 11,620, by the School Board, thus reducing the cash value \$0.63 per ton.

**Michel.**—This coal seems to have been the only one which was tendered on with a guaranteed B. T. U. content, so there is no means of comparing it with the American varieties which were not guaranteed, but the following reports of analyses and tests will only serve to show the bidders were within the safety zone when they guaranteed 13,500 B. T. U. This guarantee was given at the request of the Chief Operating Engineer, who intimated that special consideration would be given to guaranteed tenders, but the way the contracts were awarded proved the reverse. The Milton Hersey Co., Ltd., took representative samples out of five cars of this coal, and the average of the five analyses were:

B. T. U. per pound on sample as received . . . 13,853  
Total Combustible matter . . . . . 89.60%

In each of the cases above reported, the samples taken by a qualified chemist of the Milton Hersey Co. Ltd., and the samples reduced by the well known quartering method which is accepted by authorities as being the only proper means of securing a representative sample. The samples of Cadomin and International were taken from stock piles, and the samples of Michel were from cars. All sampling was done by the chemist without any assistance or interference from interested persons, so he alone is responsible for the accuracy of the tests.

#### *Canadian Slack Coal Also Best Value*

The above analyses are of mine run coal, and as the School Board refused to consider any tenders of Canadian slack coal we will give a few analyses of Michel and Coal Creek slack which will show the high quality of these fuels.

A car of Michel Slack was used at the McPhillips Street Pumping Station, which Mr. J. A. Blackie, City Chemist, sampled and gave the following analysis:

Sample No. 1 B. T. U. per pound . . . . . 13,515  
Sample No. 2 B. T. U. per pound . . . . . 13,789

From cars of Coal Creek slack, Mr. Blackie made the following analysis:

Sample as received B. T. U. per pound . . . 13,744

It is doubtful if the Pocohontas slack that is being delivered at the schools will equal these analyses, and the price paid is \$12.50 as compared with the tender of Michel at \$11.95 which was rejected without comment.

180 tons of Youghioghenny was bought by the Board at \$12.55 per ton, so it will be interesting to note the results of a practical steaming test conducted by the Manitoba Government at the Industrial Training School, Portage La Prairie in December last.

Each coal was tested for eight hours, and the figures here given are certified correct by Mr. L. Bickle, the engineer in charge of the tests.

#### **Youghioghenny Mine Run Coal**

Total coal fired . . . . . 1800 lbs.  
Equivalent evaporation of water per pound of coal fired, from and at 212 degrees F. . . . . 10.03 lbs.

Remarks: — Test started with running at 10.00 a.m. Fire cleared before run and at end of run. No coal put on fire at end of run. Coal was very coarse.

#### **Michel Mine Run Coal**

Total coal fired . . . . . 1800 lbs.  
Equivalent evaporation of water per pound of coal fired, from and at 212 degrees F. . . . . 11.00 lbs.

Remarks: — Test started with a running start at 10.30 a.m. Fired cleared before run and completely cleared at end of run, and 100 lbs. of fresh coal put on fire to bring it to same thickness as at the start. This 100 lbs. is included in the 1800 lbs. above mentioned. First 900 lbs. of coal was slack, next 900 lbs. Mine Run.

Certified correct.

Dec. 22, 1922.

(Signed) L. BICKLE.

From this test it is seen that Michel coal, which was half slack, proved nine per cent. more efficient than the best Youghioghenny lump, after the Michel fireman threw in 100 lbs. of coal for good measure at the end of the test.

\* \* \*

The object of writing this article is to bring to the attention of the people of Western Canada and of Canadians in general, the injustice that has been done our Canadian coals in this market. We realize there are some Canadian coals which are not capable of competing with the foreign product, but that is no reason why they should all be condemned; and in the case of the Public School Board here dealt with, the tax payers of Winnipeg are out of pocket many thousands of dollars by purchasing imported coals at higher prices than the best Canadian coals were offered. There is not a school building in Winnipeg that cannot be heated just as efficiently, and more cheaply, with our own coals than with the coals purchased. If the citizens of Winnipeg are satisfied to pay out their good money to patronize foreign industry at higher prices than the equivalent value of Canadian products, then our labor is wasted; but we do not believe this to be the case.

The province of Yunnan, which comprises the south western portion of China, is reported as rich in minerals, whose development has been retarded chiefly on account of inadequate transportation, the sea being far distant and railways almost unknown. Tin and antimony are the chief mineral products at present, but the ores of copper, iron, lead and zinc, as well as coal, are said to be abundant. The native industry at present requires little of these metals, and coal is only slowly replacing charcoal as a domestic fuel.



## RESEARCHS UNDER WAY

### *Electro Thermic Metallurgy of Zinc*

In the work on the electrothermic metallurgy of zinc being conducted at the Mississippi Valley experiment station of the United States Bureau of Mines at Rolla, Mo., experiments will be continued with the electrothermic dry distillation process. In large scale experiments with this process, difficulty has been encountered in the fact that condenser linings made from ordinary refractories break down, due to carbon deposition around particles of iron oxide contained in the refractory material. Small scale experiments will be conducted, using condensers lined with various iron free refractories to determine what materials are useful for this purpose. The physical and chemical behavior of the metals commonly associated with zinc, such as cadmium, lead and silver, during the distillation and condensation operation will be studied as well as the effect of these metals on the treatment of complex ores by the electrothermic dry distillation method, with the especial object of determining the recoveries of lead and silver possible.

### *Treatment of Zinc Retort Residues*

Large tonnages of residues from the retort distillation of zinc ores, containing much unburned coal and several per cent. of zinc as well as lead and silver, are now discarded as waste. Several methods have been proposed for treating these residues and some are in use in certain places, especially where the residues contain lead and silver. A survey will be made by the Mississippi Valley Experiment Station of the processes that have been proposed and of those now in use for the treatment of this material, and data will be collected as to the tonnages available as well as typical analyses, both of currently produced residues and of those from past operations. The information collected should be of benefit to those in the industry who are working on this problem. If the survey indicates it to be advisable, experimental work will be inaugurated by the Bureau of Mines in an effort to develop some process to recover economically the valuable contents of these residues.

### *Zinc As Roofing Material*

An investigation started by the Mississippi Valley experiment station as an inquiry into the availability of zinc as a roofing material for use on farm buildings has been broadened in scope to include a general investigation of zinc as a roofing material. The work is being directed by C. E. van Barnveld, superintendent of the Mississippi Valley station.

### *Deoxidation Or Metallization Of Calcines*

Very good results have been obtained in the deoxidation of calcines and oxidized iron ore by a tube furnace designed at the Southwest Station of the Bureau of Mines, Tucson, Arizona. A tube 3 in. in diameter by 7 ft. long was cast from Thermalloy (an iron-chrome-aluminum alloy), and was set at a slight angle from the horizontal, and operated at about 14 R. P. M. At the upper or intake end, the ore charge was fed into the tube by a worm feed to insure the exclusion of air or oxygen entering with the charge. The lower or exit end of the tube revolved in a packing joint set in the wall of the cooling bin to prevent reoxidation before cooling. Six feet of this tube forming the reaction zone was enclosed with brick to conserve the heat. This portion was externally heated to a reaction temperature of about 950 deg. C. Iron ore or calcines, plus 1-2 by weight soft bituminous coal, was passed, by continuous feed and discharge, into the tube at the rate of 20 lbs. per hour. The charge remained in the reaction zone

approximately 7 minutes, and a completely deoxidized sponge iron product was produced. Under cooperative agreement with the Tintic Milling Co., Silver City, Utah, experiments are being conducted for comparative results with Thermalloy tubes of 4, 6, 8 and 12-in. diameters, by 10-ft. long.

## CARBON BLACK FROM NATURAL GAS

Carbon black is the term generally applied to the finely divided carbon deposited when natural gas is allowed to burn in an insufficiency of air and the flame made to impinge on a metallic surface. It should not be confused with lamp-black which is made from such materials as tar and vegetable oils. Carbon black was first manufactured from artificial gas but now nearly all the world's production is made from natural gas.

During the year 1915 it was discovered that carbon black could be combined with rubber instead of the pigments formerly used to give strength and toughness to such articles as automobile tires, footwear, and other rubber goods subject to abrasion. The result was so successful that at the present time the rubber manufacturers are the largest consumers of this material. It is also used in the manufacture of printing inks, paints, paper, and many other commodities.

Nearly the whole of the world's production comes from the United States, chiefly from West Virginia and Louisiana, the amount in 1920 being 51,321,892 pounds derived from 40,598,978,000 cubic feet of natural gas. A large export trade has been built up and in 1921 the value of exports to England were valued at half a million dollars, to Japan a quarter of a million dollars, and to France nearly two hundred thousand dollars. Canada is also dependent on the United States for her requirements of approximately 2,000,000 pounds a year valued at about \$220,000.

An uncertain factor in the carbon black industry of the United States has been that of a supply of gas at low cost. There are extensive fields of natural gas available in certain sparsely settled areas in Canada, not too far removed from transportation facilities, which would possibly insure an uninterrupted supply of gas at small expense.

The question of establishing a carbon black industry in Canada appears to be well worth looking into as the demand for carbon black both at home and abroad is bound to grow. Moreover, the available surplus for export from the United States is likely to diminish rather than to increase.—Natural Resources.

The iron and steel plant of the Broken Hill Proprietary Co. at Newcastle, 60 miles north of Sydney, Australia, is still idle. In view of a renewal of operations, the company has bought a coal mine near Newcastle, and now owns an adequate supply of all raw materials. It has four blast-furnaces with a nominal daily capacity of 1500 tons, or 460,000 tons of pig-iron per annum, and seven basic open-hearth furnace with an annual capacity of 300,000 tons of steel. A recent application to the Arbitration Court for the reduction of wages that must precede the resumption of operations was refused.

Radium ore produced in the Belgian Congo now controls the world's market. It has such a high content of the precious element that it is likely the price of radium will be reduced even below its present record low level.

Investigations into the use of peat in Finland have resulted in a mechanical process much like that developed by the Joint Peat Committee in Canada, in which the sun does most of the work required.



# The Mining Districts

BY THE JOURNAL'S CORRESPONDENTS

## NORTHWESTERN ONTARIO

**RED LAKE CLAIMS.**—The total number of claims recorded with H. E. Holland, mining recorder at Kenora, as staked in the Red Lake area in the District of Patricia is one hundred and fifty seven. Of these seventeen have been allowed to lapse, so that at this writing there are one hundred and forty claims in the Red Lake district in good standing. This is quite a drop from the grand total of a thousand staked claims claimed by certain irresponsible persons and published in good faith by the daily and technical press; but exaggeration never does a district any service. After all, a hundred and forty claims in such a remote camp is not a bad showing for an autumn's exploration. The coming summer will tell the tale; either there will really be a thousand claims staked and recorded or there will be *crêpe* on the front door.

**DRYDEN.**—The sulphate pulp mill at Dryden is now making use of soapstone obtained from the deposit nearby for lining its smelting furnaces. The soapstone blocks for this purpose formerly were imported.

**WABIGOON.**—Some promising gold prospects are being opened up in the Wabigoon Lake area. Twenty-five years ago the Wabigoon and Manitou districts, south of the C. P. R., were the scene of a gold boom, which petered out in stock-jobbing, comparatively little work of exploration or mining development being done. It is quite possible that this renewal of activity, if conducted sanely and honestly, will result in the location of payable ore-bodies.

## NOVA SCOTIA

**COAL SHIPMENTS FROM LOUISBURG.**—There were no fewer than eight large ships in Louisburg harbour in one day last week waiting for coal, all making delivery at New England ports. The winter shipment of coal has kept the collieries busy this winter, and except for storms not one day has been lost. The large coal heaps at the collieries are tangible evidence of large outputs, for with all the winter shipping a considerable amount of coal has to be placed in the stock piles awaiting spring.

**D. H. MACDOUGALL ON HOLIDAY.**—D. H. MacDougall, vice-president of the British Empire Steel Corporation, has left for southern France for a well-earned rest, accompanied by Mrs. MacDougall. Few men have given such close attention to business over an extended term of years as has Mr. MacDougall. *The Canadian Mining Journal* wishes him a very pleasant vacation.

**WALTER HERD RETURNS AND A. S. MCNEILL SAILS.**—Walter Herd, Mining Engineer of the Dominion Coal Company, has just returned from Britain, where he spent several weeks getting in touch with all that is new in coal mining there. Alex. S. McNeill, General Superintendent of the Dominion Coal Company, has sailed for Britain, to remain for two months. Most of his time will be spent in the collieries of England, Scotland and Belgium. Mr. McNeill is a very capable mining man already, and it shows good judgment on the part of the Company to send him and other officials to other coal mining fields, that they may enrich their

experience with added knowledge and learn what others are doing and how they are doing it. Governments send out representatives to collect new ideas and find what the rest of the world is doing, so why not large corporations? Nova Scotia coal fields combine many of the features found in foreign coal fields, and it is money well invested to have officials responsible for the Canadian mines become personally acquainted with problems and methods in other fields. Under the superintendency of Mr. McNeill the outputs of the Cape Breton collieries has made large gains, and it is not unsafe to predict that at a date not far distant 20,000 tons daily output may be reached.

**THAT LABRADOR GOLD!**—There are more smiles than serious faces when the reputed new placer fields of Labrador are discussed in Sydney. Last week there was a telegraphed inquiry to the Board of Trade to ask whether adequate shipping would be available to accommodate the gold seekers in the spring. After the laughter had subsided, the Board of Trade decided that they could find ships for all comers.

**THE REDS AGAIN.**—J. B. McLachlan and his group of radical enthusiasts at Sydney will not be downed by President John L. Lewis of the U. M. W. A. He has sent a letter, signed on behalf of District 26, in which he defends the principles of the Red International, and states that he looks for redress from the incoming headquarters board of the U. M. W. A.

**PICTOU COAL PRODUCTION.**—The mainland collieries of Nova Scotia, as well as those of Cape Breton, are thriving. During 1922 the Acadia Coal Company of New Glasgow shipped 365,723 tons, as compared with 320,064 tons in 1921. Assistant General Manager J. J. McDougall reports that the collieries are in first-rate shape and will soon be back to pre-war production if conditions for selling remain good.

**SHORTAGE OF MINERS.**—There still remains a decided shortage of skilled miners in the collieries of the province. It is possible to fill the need by means of training new miners, but that is slow work at best and meantime the province, as well as the companies, is wasting an opportunity for further advance in its coal trade.

## COAL AND METAL MINES IN CANADA

The Mines Branch, Ottawa, now have ready for distribution the revised lists of *Metal Mines in Canada* and *Coal Mines in Canada*. These lists are quite formidable in size, and in the case of the coal mines most of those listed are marked as active. The list of metal mines contains many that are moribund, and where possible these are noted as such. As the metal mines are not under such strict government supervision as coal mines and as they are likewise more widespread in distribution and in more remote parts of the Dominion, reliable and recent information about them is harder to obtain. The Mines Branch asks for co-operation from the mining public in keeping these lists up-to-date. Information is given as to the name of the operating company, address, name of mine, location and address of mine and the manager.



## BRITISH COLUMBIA

**CANADA COPPER HOLDINGS.** The report that the Granby Consolidated Mining & Smelting Co. contemplates the absorption and the operation of the mine and plant of the Canada Copper Co., Copper Mountain, directs attention to the latter properties, which are situated close to Princeton and upon which much development has been done. Not only has considerable diamond drilling and other exploratory work been carried out, with the result that a large body of low-grade copper ore has been proven, but a concentrator has been installed at Allenby, some miles distant, and a railway constructed from the same to the mines at heavy expense. It was stated at the time the mill was first ready for use that a contract had been entered into with the Consolidated Mining & Smelting Co. of Canada for the shipment of the concentrates to the Trail Smelter and it is a fact that power was to be derived from the West Kootenay Power & Light Co., of Bonnington Falls near Nelson, the extension of the wires for this purpose having been practically completed. With plans rapidly nearing fruition, the project of actual mining and milling the ores of Copper Mountain came to a sudden halt. The low price of copper at the time was generally believed to be the explanation of this and lately there has been speculation locally regarding the future of the enterprise, having in mind the improvement of the copper market.

Certain British Columbia mining men claim that the preliminary work at Copper Mountain proved 10,000,000 tons of ore, with another 2,000,000 tons of "probable" ore. The values are said to average 35 cents per ton in gold and silver and thirty-four pounds of copper per ton. As to the mill, its capacity is placed at 2,000 tons a day, and a trial run in 1920 was satisfactory except in one particular. The ore proved to be tougher than expected and it was found that heavier crushers and rolls would be necessary. Since that time the plant has been idle. The cost of the railway, which runs up the Similkameen River and gives the mine connection with the Kettle Valley Railway, is estimated to have been \$2,000,000, having proved one of the heaviest pieces of construction ever put through in a country with a reputation for costly railway work. To put this railway in shape for use doubtless would mean a substantial outlay as there have been mud and rock slides during the period of idleness.

**MINE ASSESSMENT.**—What is the proper allowance to be made for depletion in the assessment of a mining property for purposes of taxation? What is a just and equitable method of arriving at a basis upon which to figure whatever rate of taxation may be adopted?

As it is at present in British Columbia the Minister of Finance is given the power of the final adjudication. The Surveyor of Taxes proceeds with the work of assessing and in due course the companies, or the operators, affected receive notice of the results of his computations. If they are not satisfied there is available the recourse of an appeal to the Finance Minister.

Mining men, or at least many of them, do not think that this is a commendable system. They criticise it from various angles but, perhaps, the chief objection is that there seems to be no fixed and generally understood regulations under which the taxation department can function in estimating such allowances as that made for the depletion of a mine. Consequently operators say they are unable to estimate and make provision for their provincial taxes from year to year. Such a condition

is not conducive to stability. It has the tendency, it is stated, to discourage rather than to stimulate the interest of outside capital.

The taxation department has declared its wish to deal fairly with the industry. It asks only that the producing mines pay their proper proportion of the financial burdens of the country, having regard for what is collected from other forms of industry and from citizens generally. As the extraction of minerals means the exploitation of the country's natural resources for the gain of one or more individuals, and as what is taken is irretrievably gone, it is maintained that the State is justified in exacting an equitable tax on production earnings. While standing thus on a principle universally recognized, the department appreciates that capital must be encouraged to invest, that the plea for stability or reliability in taxation methods in order that operators may be inconvenienced as little as possible is well founded, and that, if the present practice is as faulty as is alleged—and this by no means is wholly admitted,—it would be of advantage to have some changes introduced.

All these matters, it is understood, were informally discussed at a recent meeting between officials of the Taxation Department and of the Mine Owners Association of British Columbia. The owners were represented by Messrs. Clapp and Young, of the Granby Consolidated Mining & Smelting Co.; Mr. Bingay, of the Silversmith Mines Ltd.; and Mr. Mortimer-Lamb, secretary of the Association. The conference was called on the invitation of the Department, not with the idea of arriving at definite conclusions but with a view to receiving suggestions at the hands of those actively engaged in mining in the Province. From these conferences it is thought that possibly some system may be evolved that in its application will be more equitable than the present method. The desire, it is stated, is to make improvements if any are found practicable.

Capital is entitled to expect that it be permitted a fair rate of interest and that, when the ore reserves of the mine in which it is invested are exhausted, the original outlay, together with adequate interest, shall have been returned. Given a knowledge of the total investment and accurate information as to the reserves and the returns from the same, and the figuring of a proper allowance for depletion is but a matter of rudimentary mathematics. This ideal condition, however, is found in few, if any, of the mines of this Province. In what class are the mines of the Slocan, for instance, to be put? Some of these have been abandoned by the owning companies, leased with or without option to purchase to enterprising miners, a rich stringer or two worked and several carloads of very high-grade ore shipped to the smelter. How is an allowance for depletion to be arrived at in such cases? And there are many properties with regard to whose ore reserves little is known. As a matter of fact almost every one of the producing mines of the Province seems to present an entirely distinct and separate problem for the assessed and the tax collector. To place one group in one class and another differently and apply a different set of regulations to each appears to offer insuperable difficulties.

Notwithstanding the complexity of the problem, however, there is much to be thankful for at present. When both sides are found anxious and willing to work together, appreciating that each has troubles and that each is anxious to effect an equitable adjustment, there is every hope that a satisfactory settlement will be reached. It is stated that there now is a very clear un-



understanding between the Taxation Department and the Mines Owners, that the latter have presented a concrete proposition that will be given consideration, and that there is no doubt that the policy is to assist in every way towards the building up of the mining industry of the Province.

**TRAIL ORE RECEIPTS.**—Ore receipts at the Trail Smelter, Consolidated Mining & Smelting Co., for the month of January totaled 35,978 tons, as compared with 36,943 tons for the same month last year. Of the former amount 31,690 tons were from the company properties, 4,288 tons being custom ore.

Receipts for the last ten days of January were 10,505 tons, made up as follows:

|                                  |          |
|----------------------------------|----------|
| Alamo, Alamo . . . . .           | 58 tons  |
| Black Rock, Northport . . . . .  | 83 "     |
| Company Mines . . . . .          | 9,231 "  |
| Henderson Gp, Smithers . . . . . | 48 "     |
| Knob Hill, Republic Wn . . . . . | 262 "    |
| Krao, Ainsworth . . . . .        | 23 "     |
| Lone Pine, Republic Wn . . . . . | 172 "    |
| Paradise, Invermere . . . . .    | 77 "     |
| Quilp, Republic Wn . . . . .     | 115 "    |
| Silversmith, Sandon . . . . .    | 150 "    |
| Steel Gp, Brisco . . . . .       | 31 "     |
|                                  | <hr/>    |
|                                  | 10,505 " |

**PIONEER PASSES.**—Thomas Mills, a veteran coal operator and prospector, died at Nanaimo on January 31st, aged 68 years. He managed several of the coal mines of Vancouver Island during their early years.

**MINE EXPLOSION.**—Preliminary investigations have failed to reveal the cause of the disastrous explosion that wrecked No. 4 mine, Cumberland, Vancouver Island, last week. The bodies of all the 33 victims have been recovered.

## CLEANING FILTER LEAVES

A useful method of cleaning filter leaves is described by T. B. Stevens in the *Journal of the Chemical, Metallurgical and Mining Society of South Africa* for November last. It is as follows:

The usual method of removing the lime incrustation from filter leaves is by circulating weak hydrochloric acid through them. This is satisfactory as regards renewing the porosity of the cloths, but it is costly for acid, especially where the acid has to be transported any distance; it has also other minor disadvantages. At Kalgoorlie it was found that with certain modifications the hydrochloric acid can be replaced with the less expensive sulphuric acid. The leaves are first removed from the filter vat and freed from adhering slime and any loose incrustations by washing and brushing in the usual manner. If the cloth is very hard a wire brush such as is used by fettlers for cleaning castings is a good tool to use, as it opens up the cloth. The leaves are next immersed in a bath containing a 2% solution of sulphuric acid, and allowed to soak in it for one hour. By this treatment all of the lime salts are converted into calcium sulphate and a considerable portion of it will be loosened and will fall away from the cloth. Some, however, will still remain in the fibre of the cloth, and this is removed by transferring the leaves to another vat and circulating fresh water through them for two or three

days. At 18° C., one part of  $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$  will dissolve in 386 parts of water, or in other words, one hundred gallons of water will dissolve nearly three pounds of calcium sulphate. The ease with which it will dissolve and the cloth softened has to be seen to be thoroughly appreciated.

The plant required for this treatment is of the most simple kind. The acid bath, if built of sound timber, three inches thick, will last for years, and one capable of accommodating six leaves is large enough for any sized filter, as the time of contact required is so short. The water vat may be of any size, either round or rectangular, and needs to be fitted with a manifold pipe on one side to which the leaves are attached. In some instances, I have forced the water through the frames, and in others I have used a small plunger pump to suck it through them. The choice of method is dependent on local conditions. The water after being used for this purpose can be utilised either to make up the mill circuit, or for the disposal of residue. Where water is scarce the same water may be circulated through the leaves until at least half saturated with calcium sulphate. The solubility of calcium sulphate may also be increased by the addition of common salt.

The softening process has been found to be just as efficient as when hydrochloric acid is used, for when the leaves are returned to the filter they will have the same duty. The cost of cleaning is very much less, for at Kalgoorlie, whilst the theoretical cost of dissolving one pound of calcium oxide with hydrochloric acid is fourteen pence, the same work can be done with sulphuric acid for four pence. The sulphuric acid treatment has also the advantage that no acid proof apparatus is required to circulate the acid. Another minor advantage is that the corrosion of the pipe-work frames is also not so great as when hydrochloric acid is used.

The greensand marl that occurs so extensively in New Jersey is not at present being used as a source of potash, though formerly it was so used. Investigations conducted by the United States Geological Survey, and described fully in Bulletin 727, recently issued, show that 257,000,000 tons of potash is potentially available by quarrying from these beds. Attempts to make use of the glauconite, which is the silicate containing the potash of the greensand, are constantly in progress, but none have been commercially successful so far.

A British company, Mozambique Oil and Mineral Concessions, Ltd., with mineral concessions in Portuguese East Africa is stated to have determined by prospecting extensive beds of auriferous gravel on the Nahavara and Nanirue rivers. A dredge has been ordered and is expected to be in operation before autumn. It is expected that this will be the first of a fleet of dredges.

Data collected by the United States Geological Survey show that over the country as a whole 40 per cent. more bituminous coal than usual was distributed by retail dealers during November and December last. In the territory where anthracite is ordinarily the domestic fuel, the increase in the delivery of bituminous coal was 35 per cent.



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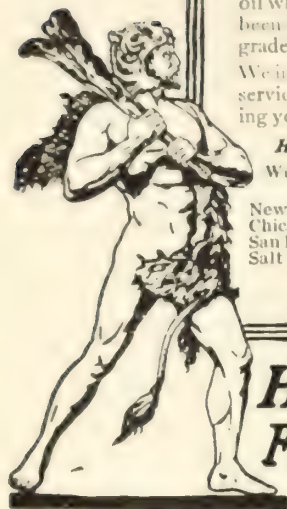
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Can. Chicago Bridge & Iron Co., Ltd.  
Horton Steel Works, Ltd.  
The William Kennedy & Sons, Ltd.

### Bluestone:

The Consol'd Mining & Smelting Co.

### Bolters:

The William Kennedy & Sons, Ltd.

### Boxes, Cable Junction:

Standard Underground Cable Co. of Canada, Ltd.  
Northern Electric Co., Ltd.

### Buggies, Mine Car (Steel):

Hendrick Manufacturing Co.  
Herbert, Alfred, Limited.  
Holman Bros., Ltd.

### Brazilian Ballas:

Diamond Drill Carbon Co.

### Brick:

Wettlaufer Bros.

### Bronze, Manganese, Perforated & Plain:

Hendrick Manufacturing Co.

### Buckets:

Canadian Ingersoll-Rand Co., Ltd.  
Canadian Link-Belt Co. Ltd.  
Hadfields, Limited.  
Hendrick Manufacturing Co.  
Herbert, Alfred, Limited.  
Holman Bros., Ltd.  
The William Kennedy & Sons, Ltd.  
Peacock Bros., Ltd.

### Bucket Lips:

Canadian Steel Foundries, Ltd.  
The William Kennedy & Sons, Ltd.

### Cable — Aerial and Underground:

Canada Wire & Cable Co.  
Standard Underground Cable Co. of Canada Ltd.  
Peacock Brothers, Limited.

- Dredging Ropes:**  
Allan Whyte & Co.  
Greening, B., Wire Co., Ltd.
- Drills, Air and Hammer:**  
Canadian Ingersoll-Rand Co., Ltd.  
Canadian Rock Drill Co.  
Denver Rock Drill Mfg. Co., Ltd.  
Herbert, Alfred, Limited  
Holman Bros., Ltd.  
Sullivan Machinery Co.  
The Mine & Smelter Supply Co.
- Drills—Core:**  
Canadian Ingersoll-Rand Co., Ltd.  
Herbert, Alfred, Limited  
Holman Bros., Ltd.  
Sullivan Machinery Co.
- Drill Steel Furnaces:**  
Canadian Ingersoll-Rand Co., Ltd.  
Denver Rock Drill Mfg. Co.  
Herbert, Alfred, Limited  
Holman Bros., Ltd.  
Sullivan Machinery Co.
- Drills—Diamond:**  
Sullivan Machinery Co.
- Drill Steel—Mining:**  
Canadian Ingersoll-Rand Co., Ltd.  
Hadfields, Limited  
Mussens, Limited
- Drill Steel Sharpeners:**  
Canadian Ingersoll-Rand Co., Ltd.
- Electric Condensers:**  
Griswold & Co.  
Canadian Rock Drill Co.  
Denver Rock Drill Mfg. Co., Ltd.  
Herbert, Alfred, Limited  
Holman Bros., Ltd.  
Northern Canada Supply Co.
- Drills—Electric:**  
Herbert, Alfred, Limited  
Holman Bros., Ltd.  
Sullivan Machinery Co.  
Northern Electric Co., Ltd.
- Drills—High Speed and Carbon:**  
Hadfields, Limited  
Herbert, Alfred, Limited  
Holman Bros., Ltd.
- Ejectors:**  
Canadian Ingersoll-Rand Co., Ltd.
- Electric Hoists:**  
Canadian Mead-Morrison Co.
- Elevators:**  
Canadian Link-Belt Co., Ltd.  
Sullivan Machinery Co.  
Northern Canada Supply Co.  
Hadfields, Limited.  
Jones & Glassco (Regd.).
- Engineering Instruments:**  
Laurie & Lamb.  
C. L. Berger & Sons.
- Oil Engines:**  
Canadian Ingersoll-Rand Co., Ltd.
- Engines:**  
Canadian Sirocco Co., Ltd.
- Engines—Gas and Gasoline:**  
Sullivan Machinery Co.  
Gould, Shapely & Muir Co., Ltd.  
Laurie & Lamb.  
The Mine & Smelter Supply Co.
- Engines—Haulage:**  
Canadian Ingersoll-Rand Co., Ltd.
- Engines—Steam:**  
Canadian Ingersoll-Rand Co., Ltd.  
Laurie & Lamb.
- Engineers:**  
Coyne, Alfred F. A.  
Dresser, John A.  
Door Co.  
Ferrier, W. F.  
Hore, R. E.  
Heves & Sons, Thos.  
Hersey Co., Ltd. Milton  
McEvoy, James C.  
Rogers, George R.  
Ross, Jas. G.  
Stewart, Robert H.  
Tyrrell, J. B.  
Whitman, Alfred B.  
Wilson, Ridgway R.
- Exhauster:**  
Canadian Sirocco Co., Ltd.
- Ferro-Alloys (all Classes):**  
Canadian Steel Foundries, Ltd.  
Canadian Steel Foundries, Ltd.  
Everitt & Co.
- Fire Fighting Supplies:**  
Gutta Percha & Rubber, Ltd.
- Flood Lamps:**  
Northern Electric Co., Ltd.
- Flotation Oil:**  
Hercules Powder Co.
- Flourspar:**  
Consolidated Mining & Smelting Co.  
Everitt & Co.
- Forging:**  
Canada Foundry & Forging, Ltd.
- Herbert, Alfred, Limited  
Holman Bros., Ltd.  
Hull Iron & Steel Foundries, Ltd.  
Smart-Turner Machine Co.
- Coal Screening Plants:**  
Canadian Link-Belt Co., Ltd.  
Canadian Mead-Morrison Co.
- Cobalt Oxide:**  
Everitt & Co.
- Compressors—Air:**  
Bellis & Morcom, Ltd.  
Canadian Ingersoll-Rand Co., Ltd.  
Denver Rock Drill Mfg. Co.  
Herbert, Alfred, Limited  
Holman Bros., Ltd.  
Laurie & Lamb.  
Smart-Turner Machine Co.  
Peacock, Brothers, Limited.
- Concrete Mixers:**  
Gould, Shapely & Muir Co., Ltd.
- Condensers:**  
Canadian Ingersoll-Rand Co., Ltd.  
Smart-Turner Machine Co.  
Belliss & Morcom, Ltd.  
Laurie & Lamb.  
Peacock Brothers, Ltd.
- Concentrating Tables:**  
Herbert, Alfred, Limited  
Holman Bros., Ltd.  
The Mine & Smelter Supply Co.
- Condensers—Electrical Static & Power:**  
Griswold & Co.
- Consulters and Engineers:**  
Milton Hersey Co., Ltd.
- Conveyors:**  
Canadian Link-Belt Co., Ltd.  
Canadian Mead-Morrison Co.  
Jones & Glassco (Regd.).
- Conveyor Belts:**  
Gutta Percha and Rubber, Ltd.
- Conveyor Flights:**  
Canadian Link-Belt Co., Ltd.
- Conveyor—Trough—Belt:**  
Canadian Link-Belt Co., Ltd.  
Hendrick Mfg. Co.  
Jones & Glassco, Regd.
- Copper:**  
Consolidated Mining & Smelting Co.
- Couplings:**  
Hans Renold of Can., Ltd.
- Cranes:**  
Canadian Link-Belt Co., Ltd.  
Canadian Mead-Morrison Co.  
Peacock Brothers, Limited  
Smart-Turner Machine Co.
- Crane Ropes:**  
Allan Whyte & Co.  
Canada Wire & Cable Co.  
Greening, B., Wire Co., Ltd.
- Crucibles:**  
The Mine & Smelter Supply Co.
- Crusher Balls:**  
Canada Foundries & Forgings, Ltd.  
Herbert, Alfred, Limited  
Holman Bros., Ltd.  
Hull Iron & Steel Foundries, Ltd.  
Peacock Brothers, Limited.  
The William Kennedy & Sons, Ltd.
- Crushers:**  
Canadian Ingersoll-Rand Co., Ltd.  
Herbert, Alfred, Limited  
Holman Bros., Ltd.  
Hull Iron & Steel Foundries, Ltd.  
Wettlaufer Bros.  
Lymans, Limited  
The Mine & Smelter Supply Co.  
Hadfields, Limited
- Cut Gears:**  
Hans Renold of Can., Ltd.  
Jones & Glassco, Regd.  
The William Kennedy & Sons, Ltd.
- Cyanide:**  
The Door Co.
- Cyanide Plant Equipment:**  
The Mine & Smelter Supply Co.
- Derricks:**  
Smart-Turner Machine Co.
- Diamond Drill Contractors:**  
Smith & Travers  
Sullivan Machinery Co.
- Digesters:**  
Can Chicago Bridge & Iron Co., Ltd.  
Horton Steel Works, Ltd.
- Diesel Engines:**  
Belliss & Morcom, Ltd.  
Laurie & Lamb.
- Dies:**  
Canada Foundries & Forgings, Ltd.  
Herbert, Alfred, Limited  
Hull Iron & Steel Foundries, Ltd.  
Holman Bros., Ltd.
- Drain Tile:**  
Wettlaufer Brothers.
- Dredges:**  
Canadian Mead-Morrison Co.
- Dredger Pins:**  
Hull Iron & Steel Foundries, Ltd.
- Dredging Machinery:**  
Hadfields, Limited  
Hull Iron & Steel Foundries Ltd.
- Cages:**  
Canadian Ingersoll-Rand Co., Ltd.  
The Mine & Smelter Supply Co.  
Herbert, Alfred, Limited.  
Holman, Ltd.  
The William Kennedy & Sons, Ltd.
- Cables—Wire:**  
Standard Underground Cable Co. Ltd.  
Canada Wire & Cable Co.
- Cable Railway Systems:**  
Canada Wire & Cable Co.
- Cam Shafts:**  
Canada Foundries & Forgings, Ltd.  
Herbert, Alfred, Limited  
Holman Bros., Ltd.  
Hull Iron & Steel Foundries, Ltd.  
Peacock Brothers, Ltd.  
The William Kennedy & Sons, Ltd.
- Car Dumps:**  
Canadian Mead-Morrison Co.  
Herbert, Alfred, Limited.  
Holman Bros., Ltd.  
Sullivan Machinery Co.
- Cars:**  
Canadian Mead-Morrison Co.  
Herbert, Alfred, Limited.  
Holman Bros., Ltd.  
John J. Gartshore.  
Peacock Brothers, Limited.  
The William Kennedy & Sons, Ltd.
- Car Pullers:**  
Canadian Mead-Morrison Co.
- Car Wheels and Axles:**  
Herbert, Alfred, Limited.  
Holman Bros., Ltd.  
Hull Iron & Steel Foundries, Ltd.  
John J. Gartshore.  
Peacock Brothers, Limited  
The William Kennedy & Sons, Ltd.
- Carriers (Gravity):**  
Jones & Glassco, Reg.
- Cast Steel Gears:**  
Canada Foundries, Ltd.  
The William Kennedy & Sons, Ltd.
- Castings (Iron and Steel):**  
Herbert, Alfred, Limited.  
Holman Bros., Ltd.  
Hull Iron & Steel Foundries, Ltd.  
Peacock Brothers, Limited.  
The William Kennedy & Sons, Ltd.
- Cement Machinery:**  
Hadfields, Limited.  
Hull Iron & Steel Foundries, Ltd.  
The William Kennedy & Sons, Ltd.
- Chains:**  
Jones & Glassco, Reg.  
Canadian Link-Belt Co., Ltd.  
Greening, B., Wire Co., Ltd.
- Chain Drives:**  
Jones & Glassco (Regd.).
- Chain Drives—Silent and Steel Roller:**  
Canadian Link-Belt Co. Ltd.  
Hans Renold of Can., Ltd.  
Jones & Glassco (Regd.).
- Chemist:**  
Thos. Heyes & Sons.  
Milton Hersey Co.  
Ledoux & Co.
- Chrome Ore:**  
Everitt & Co.
- Crusher Jaws:**  
Canadian Steel Foundries, Ltd.  
The William Kennedy & Sons, Ltd.
- Crushing Rolls:**  
Canadian Steel Foundries, Ltd.  
The William Kennedy & Sons, Ltd.
- Classifiers:**  
The Door Company
- Clutches:**  
Canadian Link-Belt Co., Ltd.  
Hans Renold of Can., Ltd.
- Coal:**  
Dominion Coal Co.  
Nova Scotia Steel & Coal Co.
- Coal Cutters:**  
Sullivan Machinery Co.  
Canadian Ingersoll-Rand Co., Ltd.  
Herbert, Alfred, Limited  
Holman Bros., Ltd.  
Peacock Brothers, Limited
- Coal Crushers:**  
Canadian Link-Belt Co., Ltd.  
Peacock Brothers, Limited.
- Coal Mining Machinery:**  
Canadian Ingersoll-Rand Co., Ltd.  
Canadian Rock Drill Co.  
Denver Rock Drill Mfg. Co., Ltd.  
Sullivan Machinery Co.  
Hadfields, Limited.  
Hendrick Mfg. Co.  
Herbert, Alfred, Limited  
Holman Bros., Ltd.



**Pipes:**

Consolidated Mining & Smelting Co.  
**Coal and Coke Handling Machinery**  
 Canadian Link-Belt Co., Ltd.

**Coal Pick Machines:**

Canadian Ingersoll-Rand Co., Ltd.  
 Herbert, Alfred, Limited.  
 Holman Bros., Ltd.  
 Sullivan Machinery Co.

**Forges:**

Canadian Steel Foundries, Ltd.  
 Hull Iron & Steel Foundries.  
 John J. Gartshore.

**Furnaces—Assay:**

Lynam's Limited.  
 Mine & Smelter Supply Co.

**Gasoline Engines:**

Bellis & Morcom, Ltd.  
 Laurie & Lamb.

**Gasoline Extraction Compressors:**

Canadian Ingersoll-Rand Co., Ltd.  
 Sullivan Machinery Co.

**Gasoline Tanks:**

Can. Chicago Bridge & Iron Co., Ltd.  
 Horton Steel Works, Ltd.

**Gaskets:**

Gutta Percha & Rubber, Ltd.

**Gears:**

Hans Renold of Canada, Ltd.  
 Jones & Glasco, Regd.  
 The William Kennedy & Sons, Ltd.

**Gears (Cast):**

Canadian Link-Belt Co., Ltd.  
 Hull Iron & Steel Foundries, Ltd.  
 The William Kennedy & Sons, Ltd.

**Gears, Machine Cut:**

The Hamilton Gear & Machine Co.  
 The William Kennedy & Sons, Ltd.

**Gold Refiners:**

Goldsmith Bros.

**Gold Trays:**

Can. Chl. Bridge & Iron Works, Ltd.  
 Horton Steel Works, Ltd.

**Grab-Buckets:**

Canadian Mead-Morrison Co.

**Hand Cars:**

Sylvester Mfg. Co., Ltd.

**Hose:**

Goodyear Tire & Rubber Co.  
 Gutta Percha & Rubber, Ltd.  
 Dunlop Tire & Rubber Co.

**Hammer Rock Drills:**

Canadian Ingersoll-Rand Co., Ltd.  
 Canadian Rock Drill Co.  
 Denver Rock Drill Mfg. Co., Ltd.  
 Herbert, Alfred, Ltd.  
 Sullivan Machinery Co.

**Hangers and Cables:**

Stan. Underground Cable Co., Ltd.

**Heating Systems:**

Canadian Sirocco Co., Ltd.

**High Speed Steel:**

Hadfields, Ltd.

**Hoists—Air, Electric and Steam:**

Canadian Ingersoll-Rand Co., Ltd.  
 Canadian Rock Drill Co.  
 Denver Rock Drill Mfg. Co., Ltd.  
 Herbert, Alfred, Ltd.  
 Holman Bros., Ltd.  
 Jones & Glasco, Regd.  
 Mine & Smelter Supply Co.  
 Canadian Link-Belt Co., Ltd.  
 Peacock Bros., Ltd.  
 Sullivan Machinery Co.

**Hoisting Towers:**

Canadian Mead-Morrison Co.

**Hose:**

Gutta Percha & Rubber, Ltd.

**Hydraulic Machinery:**

Hadfields, Ltd.  
 Bellis & Morcom, Ltd.  
 Laurie & Lamb.  
 The William Kennedy & Sons, Ltd.

**Oil Storage Tanks:**

Can. Chicago Bridge & Iron Co., Ltd.  
 Horton Steel Works, Ltd.  
 The Toronto Iron Works, Ltd.

**Industrial Chemists:**

Hersey, M. & Co., Ltd.

**Insulating Compounds:**

Stan. Underground Cable Co.

**Inspectors:**

Hersey, M. & Co., Ltd.

**Jacks:**

Northern Canada Supply Co.

**Jaw & Gyratory Crushers:**

Engineering & Equipment  
 Herbert, Alfred, Limited.  
 Holman Bros., Ltd.

**Lamp-Miners:**

Northern Electric Co.  
 Peacock Bros., Ltd.

**Lead (Pig):**

Consolidated Mining & Smelting Co.

**Levels:**

C. L. Berger & Sons.

**Light & Heavy Steel Plate Construction:**

Hendrick Mfg. Co.  
 The William Kennedy & Sons, Ltd.

**Locomotives (Steam, Compressed Air and Storage):**

Canadian Ingersoll-Rand Co., Ltd.  
 Laurie & Lamb.

**Link Belt:**

Canadian Link-Belt Co., Ltd.  
 Northern Canada Supply Co.  
 Jones & Glasco, Regd.

**Machine Guards:**

Greening, B. Wire Co., Ltd.

**Magnesium Metal:**

Everitt & Co.  
 Hull Iron & Steel Foundries, Ltd.

**Manganese Steel:**

Hadfields, Ltd.  
 Hull Iron & Steel Foundries, Ltd.

**Manganese-Steel Trackworks:**

Canadian Steel Foundries, Ltd.

**Metal Merchants:**

Consolidated Mining & Smelting Co.  
 C. L. Constant Co.  
 Everitt & Co.

**Metallurgical Engineers:**

The Dorr Co.

**Metallurgical Machinery:**

Dwight & Lloyd Sintering Co.  
 The Dorr Co.  
 The Mine & Smelter Supply Co.

**Metal Work, Heavy Plates:**

Can. Chicago Bridge & Iron Co., Ltd.  
 Horton Steel Works, Ltd.  
 The William Kennedy & Sons, Ltd.

**Mica:**

Everitt & Co.

**Mine Cars:**

Canadian Steel Foundries, Ltd.  
 The William Kennedy & Sons, Ltd.

**Mining Engineers:**

Hersey, M. & Co., Ltd.

**Mining Drill Steel:**

Hadfields, Limited.

**Mining Requisites:**

Dominion Wire Rope Co., Ltd.  
 Hadfields, Limited.  
 Hull Iron & Steel Foundries, Ltd.

**Mining Ropes:**

Dominion Wire Rope Co., Ltd.  
 Peacock Brothers, Ltd.

**Mine Surveying Instruments:**

C. L. Berger & Sons.

**Molybdenite:**

Everitt & Co.

**Motors:**

Peacock Brothers, Ltd.

**Nickel:**

The Mond Nickel Co., Ltd.

**Ore Handling Equipment:**

Canadian Link-Belt Co., Ltd.  
 Canadian Mead-Morrison Co.  
 Herbert, Alfred, Limited.

**Ore Sacks:**

Northern Canada Supply Co.

**Ore Testing Works:**

Ledoux & Co.  
 Can. Laboratories.  
 Hoyt Metal Co.

**Ores & Metals—Buyers & Sellers of:**

Geo. G. Blackwell.  
 Consolidated Mining & Smelting Co.  
 Everitt & Co.

**Oils:**

Hercules Powder Co.

**Pavers:**

Wettlaufers Brothers.  
 Gutta Percha & Rubber, Ltd.  
 Laurie & Lamb.

**Perforated Metals:**

Hendrick Mfg. Co.  
 Canada Wire & Iron Goods Co.  
 Greening, B. Wire Co.

**Pillow Blocks:**

Canadian Link-Belt Co., Ltd.  
 The William Kennedy & Sons, Ltd.

**Pipe — Wood Stave:**

Pacific Coast Pipe Co.  
 Mine & Smelter Supply Co.  
 Canadian Ingersoll-Rand Co., Ltd.

**Rock Rock Drills:**

Mine & Smelter Supply Co.  
 Herbert, Alfred, Limited.  
 Holman Bros., Ltd.

**Plate Works:**

Can. Chl. Bridge & Iron Co., Ltd.  
 Hendrick Mfg. Co.  
 The William Kennedy & Sons, Ltd.  
 Horton Steel Works, Ltd.

**Platinum Refiners:**

Goldsmith Brothers.

**Pneumatic Tools:**

Canadian Ingersoll-Rand Co., Ltd.  
 Herbert, Alfred, Limited.  
 Holman Bros., Ltd.

**Portable Column Hoists:**

Canadian Ingersoll-Rand Co., Ltd.  
 Denver Rock Drill Mfg. Co.  
 Herbert, Alfred, Limited.  
 Holman Bros., Ltd.  
 Sullivan Machinery Co.

**Power Factor Correcting Devices:**

Griswold & Co.

**Power Condensers:**

Griswold & Co.

**Prospecting Mills & Machinery:**

Mine & Smelter Supply Co.

**Pumps—Pneumatic:**

Canadian Ingersoll-Rand Co., Ltd.  
 Smart-Turner Machine Co.  
 Sullivan Machinery Co.

**Pumps—Steam:**

Canadian Ingersoll-Rand Co., Ltd.  
 Northern Canada Supply Co.  
 Peacock Brothers, Ltd.  
 Smart-Turner Machine Co.

**Pumps—Turbines:**

Smart-Turner Machine Co.  
 Canadian Ingersoll-Rand Co., Ltd.  
 Laurie & Lamb.  
 Peacock Brothers, Ltd.

**Pumps—Vacuum:**

Canadian Ingersoll-Rand Co., Ltd.  
 Smart-Turner Machine Co.  
 Peacock Brothers, Ltd.

**Pumps—Valves:**

Peacock Brothers, Ltd.

**Pulleys Shafting and Hangers:**

The William Kennedy & Sons, Ltd.

**Pulverizers—Laboratory:**

Herbert, Alfred, Limited.  
 Holman Bros., Ltd.  
 Mine & Smelter Supply Co.

**Pumps—Boiler Feed:**

Canadian Ingersoll-Rand Co., Ltd.  
 Smart-Turner Machine Co.  
 Peacock Brothers, Ltd.

**Pumps—Centrifugal:**

Canadian Ingersoll-Rand Co., Ltd.  
 Laurie & Lamb.  
 Peacock Brothers, Limited.  
 Smart-Turner Machine Co.

**Pumps—Diaphragm:**

The Dorr Company.  
 The William Kennedy & Sons, Ltd.

**Pumps—Electric:**

Canadian Ingersoll-Rand Co., Ltd.  
 Laurie & Lamb.

**Peacock Brothers, Ltd.**

Smart-Turner Machine Co.

**Pumps—Sand & Slime:**

Canadian Ingersoll-Rand Co., Ltd.  
 Laurie & Lamb.  
 Mine & Smelter Supply Co.  
 Peacock Brothers, Ltd.  
 Smart-Turner Machine Co.  
 Sylvester Mfg. Co., Ltd.

**Push Cars:**

Sylvester Mfg. Co.

**Poultry Netting:**

Greening, B. Wire Co., Ltd.

**Quarrying Machinery:**

Canadian Ingersoll-Rand Co., Ltd.  
 Canadian Rock Drill Co.  
 Denver Rock Drill Mfg. Co., Ltd.  
 Hadfields, Limited.  
 Herbert, Alfred, Limited.  
 Holman Bros., Ltd.  
 Sullivan Machinery Co.

- Balls:**  
Hadfields, Limited.  
John J. Gartshore.
- Refiners:**  
Goldsmith Brothers.
- Riddles:**  
Hendrick Mfg. Co.
- Rod Mills:**  
Mine & Smelter Supply Co.
- Roll Shells:**  
The William Kennedy & Sons, Ltd.  
Canadian Steel Foundries, Ltd.
- Roller Chain:**  
Hans Renold of Canada, Ltd.  
Canadian Link-Belt Co., Ltd.  
Jones & Glassco, Regd.
- Rope—Manilla & Jute:**  
Jones & Glassco, Regd.  
Allan, Whyte & Co.
- Rope—Wire:**  
Anglo Canadian Wire Rope Co.  
Allan, Whyte & Co., Ltd.  
Canada Wire & Cable Co.  
Canada Wire & Iron Goods Co.  
Dominion Wire Rope Co., Ltd.  
Greening, B. Wire Co.
- Rolls—Crushing:**  
Canadian Ingersoll-Rand Co., Ltd.  
Everitt & Co.  
Hadfields, Limited.  
Hull Iron & Steel Foundries, Ltd.  
Herbert, Alfred, Ltd.  
Holman Bros., Ltd.  
Wettlaufer Bros.
- Samplers:**  
Canada Metal Co.  
Ledoux & Co.  
Milton Hersey Co.  
Thos. Heyes & Son.  
Mine & Smelter Supply Co.
- Screens:**  
Canadian Ingersoll-Rand Co., Ltd.  
Greening, B. Wire Co.  
Hendrick Mfg. Co.  
Canada Wire & Iron Goods Co.
- Screens—Cross Patent Flanged Lip:**  
Hendrick Mfg. Co.
- Screens—Perforated Metal:**  
Hendrick Mfg. Co.
- Screens—Shaking:**  
Canadian Link-Belt Co., Ltd.  
Hendrick Mfg. Co.
- Screens—Revolving:**  
Canadian Link-Belt Co., Ltd.  
Hendrick Mfg. Co.  
The William Kennedy & Sons, Ltd.
- Separators:**  
Smart-Turner Machine Co.  
Mine & Smelter Supply Co.
- Sewer Pipes:**  
Wettlaufer Bros.
- Shaft Contractors:**  
Hendrick Mfg. Co.
- Sheet Metal Work:**  
Hendrick Mfg. Co.
- Sheets—Genuine Manganese Bronze:**  
Hendrick Mfg. Co.
- Sheets and Dies:**  
Hull Iron & Steel Foundries, Ltd.  
Peacock Brothers, Ltd.  
The William Kennedy & Sons, Ltd.
- Ship Loaders:**  
Canadian Mead-Morrison Co.
- Silent Chain:**  
Canadian Link-Belt Co., Ltd.  
Hans Renold of Canada, Ltd.  
Jones & Glassco, Regd.
- Silent and Steel Roller:**  
Canadian Link-Belt Co., Ltd.  
Jones & Glassco, Regd.
- Saline Refiners:**  
Goldsmith Brothers.
- Smelters:**  
Goldsmith Bros.
- Sledges:**  
Canada Foundries & Forgings.
- Sintering:**  
Dwight & Lloyd Sintering Co., Inc.
- Smoke Stacks:**  
Can. Chicago Bridge & Iron Co., Ltd.  
Horton Steel Works, Ltd.  
Hendrick Mfg. Co.  
The William Kennedy & Sons, Ltd.
- Special Machinery:**  
The William Kennedy & Sons, Ltd.
- Spelter:**  
Consolidated Mining & Smelting Co.
- Sprockets:**  
Hans Renold of Canada, Ltd.
- Canadian Link-Belt Co., Ltd.  
Jones & Glassco, Regd.  
The William Kennedy & Sons, Ltd.
- Static Condensers:**  
Griswold & Co.
- Spring Coil & Clips Electric:**  
Canadian Steel Foundries, Ltd.
- Steel Barrels:**  
Smart-Turner Machine Co.
- Stamp Batteries:**  
Herbert, Alfred, Limited.  
Holman Bros., Ltd.
- Stamp Forgings:**  
Canada Foundries & Forgings, Ltd.  
Hull Iron & Steel Foundries.
- Steel Castings:**  
Canadian Steel Foundries, Ltd.  
Canadian Brakeshoe Co., Ltd.  
Hull Iron & Steel Foundries, Ltd.  
Hadfields, Ltd.  
The William Kennedy & Sons, Ltd.
- Steel Drills:**  
Canadian Rock Drill Co.  
Denver Rock Drill Mfg. Co., Ltd.  
Sullivan Machinery Co.  
Peacock Brothers, Ltd.  
Canadian Ingersoll-Rand Co., Ltd.
- Steam Hoisting Engines:**  
Canadian Mead-Morrison Co.
- Steam Engines:**  
Belliss & Morcom, Ltd.  
Laurie & Lamb.
- Steam Traps:**  
Canadian Sirocco Co., Ltd.  
Laurie & Lamb.
- Steel Drums:**  
Smart-Turner Machine Co.
- Steel-Tool:**  
N. S. Steel & Coal Co.  
Hadfields, Limited.
- Structural Steel Work—Light:**  
Hendrick Mfg. Co.  
The William Kennedy & Sons, Ltd.
- Stone Breakers:**  
Holman Brothers, Ltd.  
Canadian Ingersoll-Rand Co., Ltd.  
Denver Rock Drill Mfg. Co.  
Herbert, Alfred, Limited.
- Stone Quarrying Machinery:**  
Canadian Ingersoll-Rand Co., Ltd.  
Denver Rock Drill Mfg. Co.  
Sullivan Machinery Co.
- Sulphate of Copper:**  
The Mond Nickel Co., Ltd.
- Surveying Instruments:**  
C. L. Berger.
- Switches:**  
Canadian Steel Foundries, Ltd.
- Switches and Turntables:**  
John J. Gartshore.
- Tables—Concentrating:**  
Mine & Smelter Supply Co.
- Tanks:**  
Can. Chicago Bridge & Iron Co., Ltd.  
Horton Steel Works, Ltd.
- Tanks—Acid:**  
Can. Chicago Bridge & Iron Co., Ltd.  
Horton Steel Works, Ltd.  
Ontario Wind Engine & Pump Co.
- Tanks—Wooden:**  
Gould, Shapley & Muir Co., Ltd.  
Ontario Wind Engine & Pump Co.  
Pacific Coast Pipe Co., Ltd.  
Mine & Smelter Supply Co.
- Tanks, Cyanide, Etc.:**  
Can. Chicago Bridge & Iron Co., Ltd.  
Horton Steel Works, Ltd.  
Hendrick Mfg. Co.  
Ontario Wind Engine & Pump Co.  
Pacific Coast Pipe Co.
- Tanks—Steel:**  
Canadian Ingersoll-Rand Co., Ltd.  
Can. Chicago Bridge & Iron Co., Ltd.  
Horton Steel Works, Ltd.  
Hendrick Mfg. Co.  
The William Kennedy & Sons, Ltd.
- Tanks—Oil Storage:**  
Can. Chicago Bridge & Iron Co., Ltd.  
Horton Steel Works, Ltd.
- Tanks—Water & Steel Towers:**  
Can. Chicago Bridge & Iron Co., Ltd.  
Horton Steel Works, Ltd.  
Ontario Wind Engine & Pump Co., Ltd.
- Tires—Auto, Truck and Bicycle:**  
Canada Foundry & Forgings, Ltd.  
Gutta Percha & Rubber, Ltd.  
Hadfields, Ltd.
- Trailers:**  
Sylvester Mfg. Co., Ltd.
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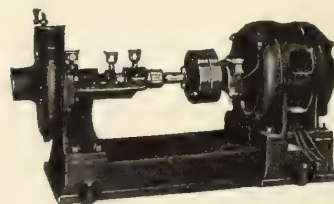
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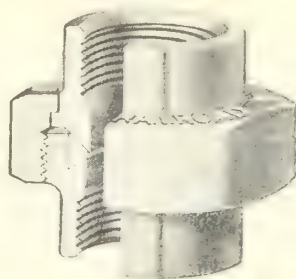


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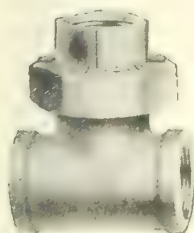
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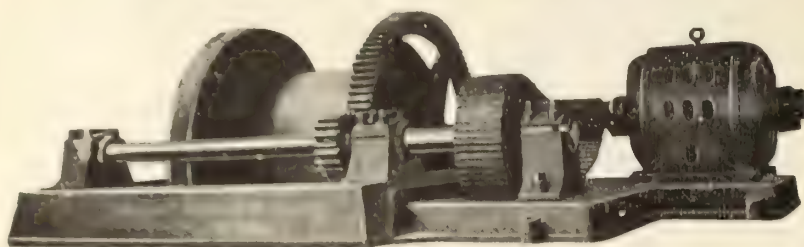
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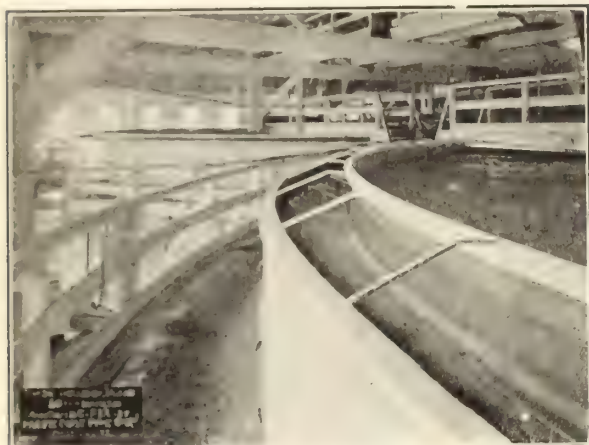
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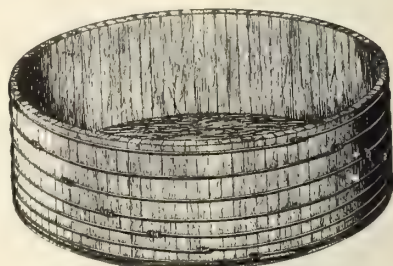
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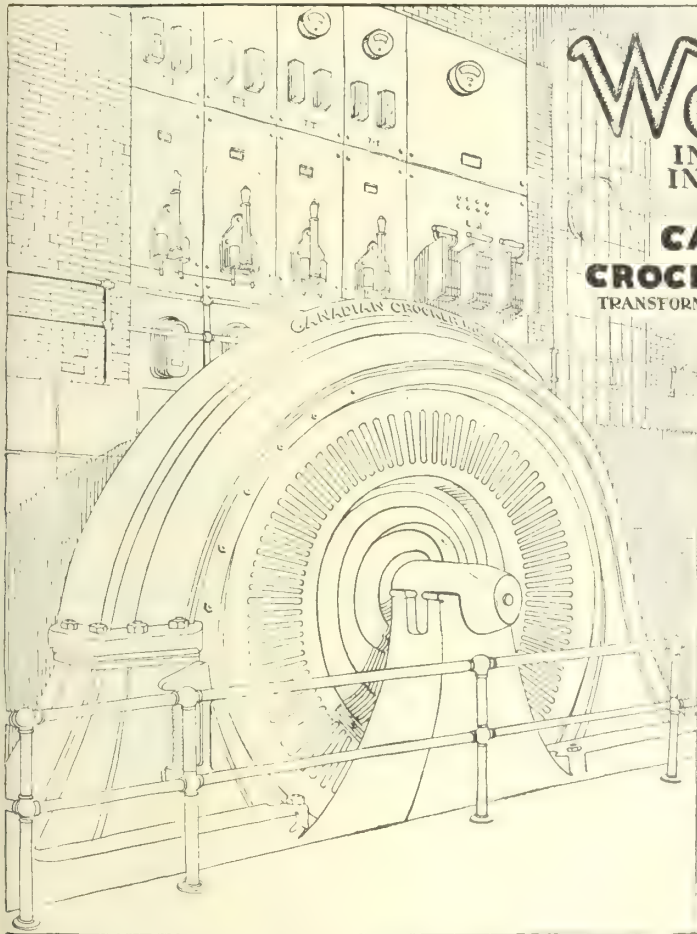
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# Ontario's



# Minerals

PROVINCE OF ONTARIO

DEPARTMENT OF MINES

HON H. MILLS, Minister of Mines

## Mineral Areas.

Ontario, with its 407,262 square miles, contains many millions of acres in which the geological formations are favorable for the occurrence of minerals, 70 per cent of the area being underlain by rocks of pre-Cambrian age. The phenomenally rich silver mines of Cobalt occur in these rocks; so also do the far-famed nickel-copper deposits of Sudbury, the gold of Porcupine and Kirkland Lake, and the iron ore of Magpie and Moose Mountain mines.

## Economic Minerals.

In addition to the above, practically all economic minerals (coal and tin excepted) are found in Ontario:—actinolite, apatite, arsenic, asbestos, cobalt, corundum, feldspar, fluor-spar, graphite, gypsum, iron pyrites, lead, mica, molybdenite, natural gas, palladium, petroleum, platinum, quartz, salt, talc and zinc. This Province has the largest deposits on the continent of talc, feldspar, mica and graphite.

Building materials, such as ornamental marble, limestone, sandstone, granite, trap, sand and gravel, lime, portland cement, brick and tile, meet every demand.

## Mineral Production.

Preliminary returns show the output of the mines and metallurgical works of the Province for the year 1921 to be worth \$48,128,387, of which the metallic production was \$27,574,202.

The following figures show the rapid growth of Ontario's mineral industry by five-year periods since 1891:

| Year.      | Value.      | Year.      | Value.       |
|------------|-------------|------------|--------------|
| 1891 ..... | \$4,705,672 | 1906 ..... | \$22,388,383 |
| 1896 ..... | 5,235,003   | 1911 ..... | 41,976,797   |
| 1901 ..... | 11,831,086  | 1916 ..... | 65,303,822   |

## Dividends.

Dividends and bonuses paid to the end of 1921 amounted to \$23,140,734 for gold mining companies, and \$84,388,185 for silver mining companies or a total of \$107,528,919.

## Mining Regulations.

A miner's license costs \$5.00 per annum, and entitles the holder to stake out in any or every mining division three claims of 40 acres each. After performing 200 days' assessment work on a claim, patent may be obtained from the Crown on payment of \$2.50 or \$3.00 per acre, depending on location in unsurveyed or surveyed territory.

## Assay Office.

The Provincial Assay Office at No. 5 Queen's Park, Toronto, is maintained by the Department of Mines for the free identification of minerals, free assays under the provisions of the Mining Act of Ontario, and also for general assay work as per the Schedule of Charges which may be obtained on application.

## Temiskaming Testing Laboratories

The Department maintains, at Cobalt, an ore sampling and testing laboratory which is now prepared to receive parcels of gold ore from 100 pounds upward, and after sampling and assaying the same to pay to the shipper the value thereof, less treatment charges. The purpose is to afford a market for ores extracted by prospectors and others in developing their mining claims, enabling them to obtain funds which they can use for further work and to report on the most satisfactory method of treatment. Fuller information may be obtained on application to the Manager, Temiskaming Testing Laboratories, Cobalt, Ontario.

## Publications.

For list of publications, illustrated reports, geological maps and mining laws, apply to

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TORONTO, CANADA.

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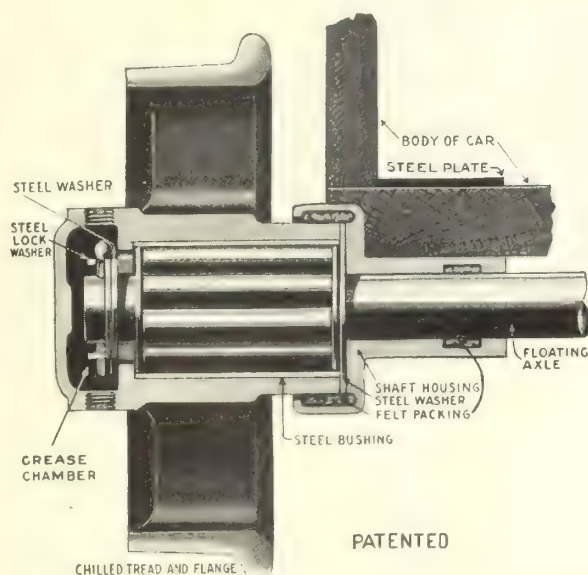
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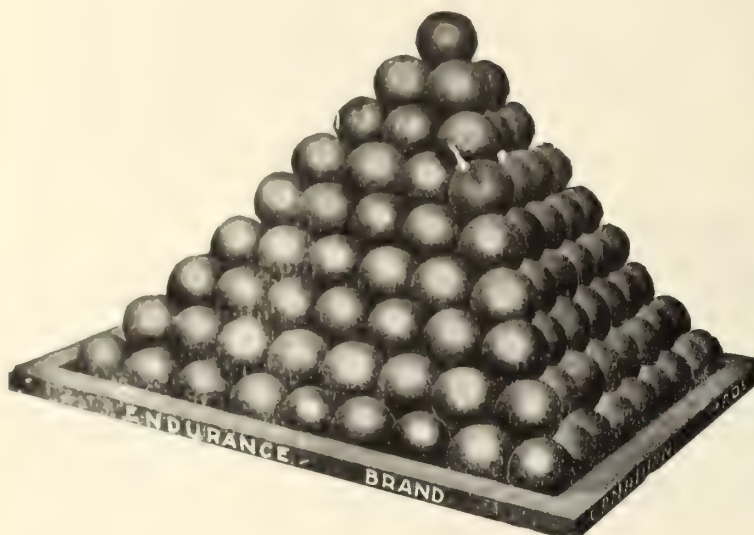
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The substantial progress of the Mining Industry of this Province is strikingly exhibited in the following figures, which show the value of production for successive five-year periods: For all years to 1895, inclusive \$94,547,241; for five years, 1896-1900, \$57,605,967; for five years, 1901-1905, \$96,509,968; for five years, 1906-1910, \$125,534,474; for five years, 1911-1915, \$142,072,603; for the year 1916, \$42,290,462; for the year 1917, \$37,010,392; for the year 1918, \$41,782,474; for the year 1919, \$33,290,313; 1920, \$35,543,084; 1921, \$28,066,641.

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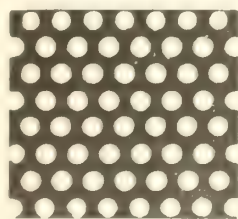
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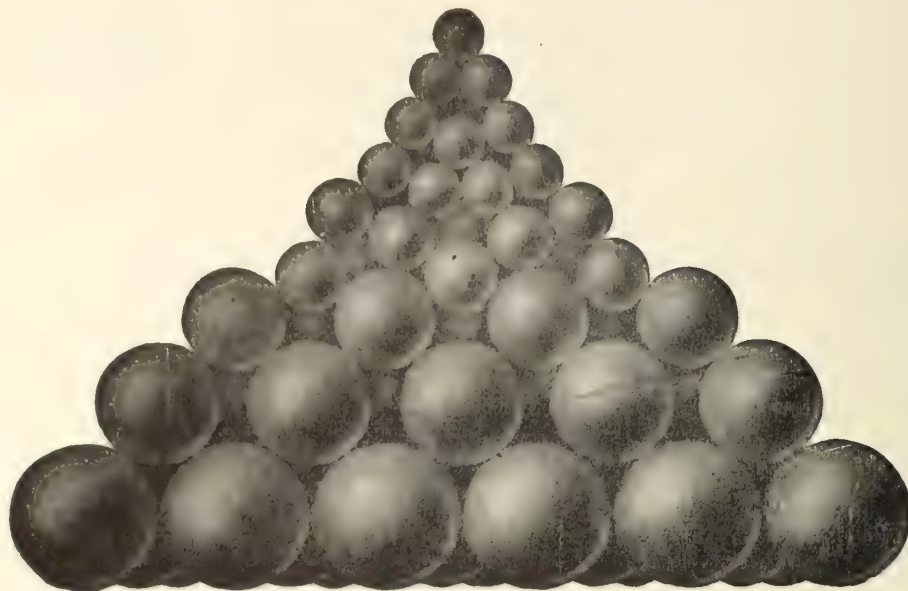
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# Canadian Mining Journal

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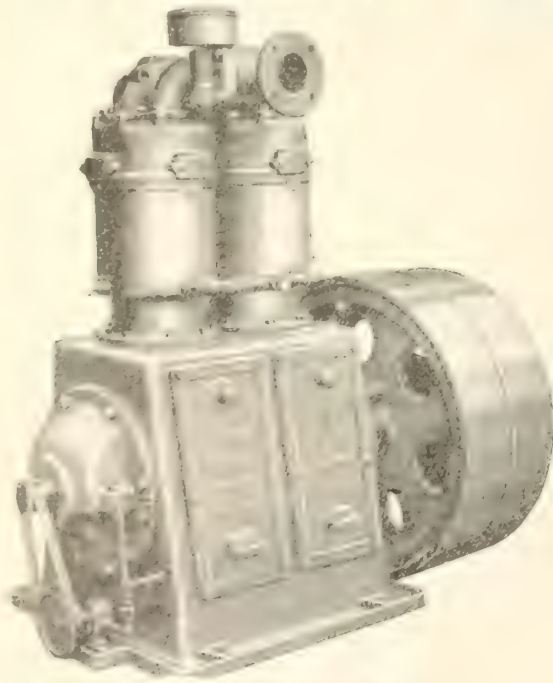
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## -:- EDITORIAL -:-

*The [Canadian Mining] Institute, while fully believing in the natural mineral wealth of Canada, can yet afford to act as a sort of "safety valve" to guard against the evil effects of "wild cat schemes" and the exaggerated reports that too often back them up. — G. E. Drummond — 1898*

### WANTED — A POLICY OF ACTION

Commendable energy and initiative has been displayed once more by the Western members of the Canadian Institute of Mining and Metallurgy in their contributions on Institute Policy in the current issue of the *Monthly Bulletin*. These Western members are at present the "livest" section of the Institute, they are well organized, and they have a definite and stated policy whose adoption they consider will be in the best interests of the Institute as a whole. We consider that the adoption of their policy as stated would be detrimental to the Institute as a whole, though it might well serve the immediate objects of these Western members. As the arguments pro and con have tended principally to veil the main points at issue rather than to illuminate them, we shall set down here what we consider to be the principles involved.

All are agreed that at present the Institute suffers from the non-application on its behalf of the talents and energy of its members. There is plenty of both talent and energy available, but for some reason Institute activities fail to receive their just share of them. Our Secretary says, in effect, "Open wide the doors to men of business and executive ability who are not now members, and we shall then have the stimulus to action we now lack." The Western members reply, "We have already too many uninterested outsiders in our midst. Give us a homogeneous membership and our problem is solved."

Both these ideas are, we hold, merely partial and both miss the real point. Our membership is by no means perfect, and never will be; but it includes the whole of the mining engineers of Canada and a host of men of first-rate ability who are not engineers, but who are actively interested in mining. If the mining engineers wish to promote the interests of their profession, they are there, in full assembly, to do it. If the Institute wishes to benefit by the co-operation of business executives and specialists in finance, it can be had for the asking from numbers of its members. What the Institute lacks at present is neither men nor adequate objects on which to expend its energies. If we formulate such objects and make provision for their accomplishment, our Institute will take up a new lease of life. This is the vital point that either has escaped

the notice of those taking part in recent discussions or has not been given the prominence due to such an essential consideration.

The Western members will say that they have already set forth an object well worthy of the Institute's attention; by making the Institute more nearly a purely professional body, we shall provide automatically for the productive activity all of us so much desire. We question the soundness of this conclusion; it is an assumption. What is our warrant for assuming that because all the members of the Institute are responsible members or adherents of the profession, they will be thus stimulated to creative effort? Furthermore, the avowed objects will tend to serve the professional engineer rather than the industry. The origin of this one-sided views can be readily understood by examining the names of those who signed the "Letter to Members" in the last *Monthly Bulletin*. Teachers and geologists comprise the larger part of the list, and the great world of affairs is almost without representation. These members and many others who agree, or partially agree, with them are rightly impressed with the potential power and influence of a professional organization of mining engineers; but we hold that such an organization is bound to act on behalf of its members rather than on behalf of the mining industry as a whole, whenever the interests of the profession and of the industry fail to coincide.

The united effort of the Western members of the Institute, by virtue of its very fact of concerted action as well as its laudable objects, has made an impression upon the members in general that is quite out of relation to the numbers supporting the move. There is danger that their arguments, so convincing on first reading, will carry the day at the annual meeting in March. The energy and initiative of the Western members and even their present objects can, we believe, be turned to good account in ways we have suggested previously in these pages. Meantime we urge, once more, that members at large examine the other side of the case as well, in preparation for the meeting, with the object of preserving in the by-laws an idea that was fundamental in the minds of those who founded the Institute.



### THE PARLIAMENTARY SESSION AND MINING

The present session of the Federal parliament promises to be more fruitful of practical measures affecting the mining industry than the last, which was decidedly barren of such results. Already a number of minor measures have been introduced. The vote for exploration and surveys in the Northwest Territories has been increased substantially. An appropriation for \$600,000 has been made for "migration within the Empire", in conjunction with the Imperial government under the Empire Settlement Act. Our archaic patent law is to be amended to bring it in line with modern international patent practice.

These items are important enough to warrant the close attention of Parliament, yet none of them touches the mining industry vitally. If our present Parliament has stiffened its spine since the close of its first session (and there is evidence that such is the case), then we may hope for some genuine steps in the progress of mining affairs, so far as they are affected by Federal administration. Chief among the questions up for settlement is the ownership of natural resources in the prairie provinces. Until the provincial departments of mines are fully responsible for the mineral resources of their respective provinces they cannot tackle their various problems with the vim and the assurance that alone will result in real progress. It is up to the trustees of our national resources in Ottawa to speed up the settlement of this question with every resource at their command.

The conference on industrial research called by the Canadian Manufacturers Association is now sitting in Ottawa. We do not doubt that this conference will recommend the establishment of a central research organization of national scope. This will involve action by our national administrative body, and we hope there will be enough vigour available to overcome the ineptitude lately displayed by our revered Senate and the procrastination that marked the last session of parliament. This national question must be handled in a truly national way.

### QUEBEC'S NEW GOLD AREA

There is a winter "rush" in progress at present to the new gold area in northwestern Quebec, and in the spring there will be an influx of much larger dimensions. As the active interest of those actually in the field and those who intend to go there, and the more remote interest of thousands who are following the course of events, is well founded, it will be worth while to review here the present status of the embryo gold camp, as well as to forecast the probable course of events.

The interest in Rouyn and Boischatel townships has a sound and substantial foundation. The geological

association of rocks that has proved to be productive of gold throughout northern Ontario occurs in these townships, and beyond, and gold in erratic shoots or in quantities too small to be worked was found years ago in adjoining areas. The stated opinion of geologists that the area is favourable for the occurrence of workable veins has been put to the test by prospectors, and two deposits, the Hamel and the Thomson-Chadbourne, both in the northwest quarter of Rouyn township, are now being tested further by stripping and diamond-drilling. Both these deposits show so far the rare quality that makes a mine possible — consistent values that persist through a width and over a length sufficient to warrant the expense of making a mine and building a mill. Both are promising, but not yet proved. Only the stripping, diamond-drilling and shaft-sinking of the coming summer can determine this point, and it may even require a considerably extended period. Mr. Hamel and associates have let a contract for diamond-drilling on the Cockeram claims, and the Thomson-Chadbourne syndicate have now on the road to their Powell claim a 50-horsepower boiler and a small compressor to aid in sinking a prospect shaft.

Apart from these two prospective ore-shoots, there is little or no definite knowledge of payable gold deposits in the field. These two discoveries, however, warrant a very thorough search for more of their kind, and any activity conducive to such a search is advisable. The townships of Rouyn and Boischatel are now covered almost completely by claims, staked mostly on the snow. There are about 200 men now in the area, and a stream of humanity moves to and fro every day on the winter road from Dane, on the Temiskaming and Northern Ontario Railway, 40 miles to the west. The nature of the mining laws not only of Quebec but of the other provinces makes it necessary thus to preëempt land. It is like the proverbial "pig in a poke"; but there is no other way at all of getting a porker in this case.

The winter staking will, no doubt, exhibit all the usual degrees of ingenuity and stupidity. The areal geological map made by Dr. M. E. Wilson and issued by the Geological Survey in 1913 is the only published map of the district. Though it lacks detail, as all areal maps must, still it has proved very useful. As shown in the reproduction published in these pages on November 17th last, the northern part of Boischatel township is a blank, as it was not examined. The map and report of Dr. H. C. Cooke giving the results of last summer's surveys have not yet been published; but fortunately a good deal of valuable information has been made available through the personal contact of geologist and prospector. The prospector who knows his job has searched out, first on the map and then on the ground, the conjunction of geological conditions known to be favourable to the occurrence of gold; that is, he has examined the rocky hill-sides that are bare in

spite of the blanket of snow that covers the level ground, and has put up his stakes where he finds side by side outcrops of porphyry or granite and Temiskaming sediments. If he is a real prospector, this will be only a preliminary to a thorough search on his claims next summer. Winter staking is illogical and wasteful of effort, but it has the virtue that it tends to promote the intensive prospecting without which few mineral deposits are to be found in the Laurentian plateau.

There is sure to be intense activity in the Rouyn-Boischatel field next summer. Much can be done by public servants to aid the prospectors who will there strive to add new units to our mineral industry. The Geological Survey at Ottawa will have ready by the spring, no doubt, Dr. Cooke's map and report, than which there can be no more practical aid. The Federal and Provincial departments will doubtless provide for further geological mapping of the field and the prompt publication of maps and reports. The recording of claims must now be done at the parliament buildings in Quebec. It is possible that the volume of recording in the new district will warrant the establishing of a branch recording office in the field. It was the rush to Cobalt that marked the first step in the de-centralising of the recording of claims in Ontario. Such a step would be a boon to prospectors in northern Quebec. Then fire-rangers must be provided in sufficient numbers to prevent conflagrations. All possible publicity as to developments must be given, as an aid to genuine investors and a deterrent of the wild and dishonest stock flotations that are sure to be attempted. Above all, provision must be made for ensuring the prevalent regard of law and order that have marked all recent mining rushes in Canada, a characteristic of which all Canadians can justly be proud.

#### THAT LABRADOR GOLD!

It is a painful contrast to turn from the genuine development in northwestern Quebec to the ridiculous furore about Labrador. One cannot say that the excitement is *in* Labrador, for there is not a soul in that ice-bound coast at present to keep an eye on the tons of gold that are alleged to be there. The excitement is based upon the unauthenticated statement of a disappointed speculator in Labrador pulpwood areas, who has returned to Montreal and started the ball rolling by means of skilful, though obvious, newspaper propaganda. The newspapers have been tools in his hands.

There is no evidence that the so-called placer diggings will ever produce an ounce of gold. The promoters of the Labrador scheme are taking advantage of the present public interest in gold mining to fill their own pockets, whatever the outcome in far-off Labrador.

The Newfoundland government has made itself a party to this scheme, for it has as yet made no public statement of the facts as they are known to the initiate, and its silence is tacit encouragement to those who are trusting their money to the Montreal promoters. It behooves the responsible members of that government to clear their skirts while yet there is time.

#### EDITORIAL NOTES

Widespread sympathy will be felt not only for the relatives of the victims of the mine explosion last week in colliery number four, Cumberland, British Columbia but also for the mine officials whose care and foresight have been frustrated by the unseen forces of nature. The responsibility for human life of a colliery manager and his staff is equalled in few positions in the mining profession or in any other part of modern industry. Acknowledgment and honour are due the men who undertake this responsibility and who, in the vast majority of cases, fulfil it successfully, but at the price of untiring watchfulness and care.

The Imperial Oil Company has demonstrated what can be done to promote not only harmony but good fellowship and a spirit of hearty co-operation between employer and employee. They have adopted for the direction and control of their relations with their employees from coast to coast the Joint Industrial Council plan, devised in England and now giving such splendid and widespread satisfaction there. This scheme not only gives all workmen a fair representation at a joint council, but likewise puts upon all workmen through their elected representatives, the burden of decision and the responsibility of carrying their decisions into effect. The plan is thoroughly in accord with British traditions and with democratic principles, and has a most beneficial effect in educating both employer and employee. Its present success in Canada as reported in the February issue of the *Imperial Oil Review* leads one to hope that it will be more generally adopted.

#### THE ANCHORITE

Give me the morning in winter when snow lies  
Light as a mist on the crust underneath;  
Free as a raucous-voiced wandering crow flies,  
Leave me to wander o'er hill and o'er heath.

Give me the evening, calm, wondrously jewelled,  
Winter's deft wizardry decking the land;  
Give me a cabin, well chinked and well fuelled,  
Books, — and what more can a mortal demand?

Someone responds, in a manner satiric,

Plainly desiring to give me a rub,  
That, in evolving this passionate lyric,  
Somehow I've left out all mention of grub!

J. C. M.





in the mine as the 4,100-foot level, it being about that distance vertically below the outcroppings on the Fairview mineral claim, from which the levels in the mine are numbered, the outcrop being zero. This main haulage-adit is about 4,900 feet long, 13 feet wide by 9 feet high, and is connected with the mine-workings on the 2,700-foot level by an incline rock-raise on a 65° slope, 1,488 feet high. This raise was finished in November last, and everything is in readiness for haulage operations by this route, which supplants the incline tramway from the 2,700-foot level to the ore-bunkers at Britannia Beach.

The new mill is designed so that the ore from the mine, broken on the crusher level in the mine to a 2½-inch ring size, will be hauled in cars of 20 tons capacity through the main haulage-adit and delivered into ore-bins on the top storey of the mill, where five bins, each having a capacity of 500 tons, will receive the broken ore. From these bins the ore passes through feeders to a collecting-conveyor equipped with a magnet and on to two Hummer screens from which the undersize, ¼ inch or less, is carried to the lower storey of the mill, and by a cross-conveyor to a belt-conveyor equipped with a tripper into six ore-bins, each having a capacity of 750 tons. The oversize goes to a set of 72-inch rolls; the material under ¼ inch is removed by Hummer screens and sent to the bins, and the oversize goes through 54-inch rolls and is returned to the screens.

From the bins the ore is carried by belt-conveyors to a weightometer, and from it into an automatic sampler. From the sampler the ore passes to three Hummer screens, from which the undersize passes into Dorr classifiers, of which there are eighteen. The oversize from the Hummer screens passes into six Hancock jigs, from which the concentrates are dis-

charged into a dewaterer, from there to an automatic sampler, which discharges the remainder to a belt-conveyor connecting with a weightometer, from which the concentrates are carried to bins ready for shipment. Middlings are returned to the circuit to pass through the jigs once more, and the tailing to the Dorr classifiers with the undersize from the screens.

The sands from the Dorr Classifiers are discharged into eighteen tube-mills, each 7 by 10 feet, and from these are returned to the Dorr classifiers, the overflow from which, together with the overflow from the dewaterer following the jigs, combined as well with the overflow from the jigs, is conveyed to flotation cells. The flotation concentrates are conveyed to an automatic sampler, from that into three Dorr thickeners; thence into two vacuum-filters, which discharge to a belt-conveyor connecting with a weightometer and finally are conveyed to the flotation concentrates bin ready for shipment. The middlings from the flotation-cells are conveyed to an air-lift and returned to the cells for re-treatment. The tailings from the cells are conveyed to an automatic sampler, sampled, and discharged to waste-dump.

The bunkers on the shipping-wharf that have been used in the past to load concentrates into vessels have been abandoned, and in their place the jig and flotation concentrate bins in the mill will be used for storage-bins, which will be connected with the hold of a vessel at the wharf by a belt-conveyor about 2,000 feet long. This arrangement removes all danger from fire in the wharf bunkers, which has always been a source of anxiety.

The officers and staff of the Britannia Mining and Smelting Co., have earned the esteem of the Canadian mining fraternity, and the *Canadian Mining Journal* offers hearty congratulations for the spirit as well as the technical skill they have displayed.

## Experimenting with the "Human Mechanics" of Industry

LABOR REPRESENTATION IN THE COLORADO FUEL AND IRON COMPANY

By JEROME DAVIS  
In "Industrial Management"

Imagine yourself being conducted through a huge industrial concern which covers over half a million acres and includes the best coal and steel properties in the state of Colorado. Miles upon miles of huge steel furnaces tower aloft belching forth clouds of dense black smoke. Enter one of the dingy buildings flanked by long lines of railroad cars and you see revolving wheels, pounding sledge hammers, rapidly moving cranes, — in short, all the mystifying details of mammoth machinery in action.

Here is a machine which takes hot steel and draws it out into fine wire one fourteen-thousandth of an inch in diameter. There is a huge automatic mechanism which almost at the speed of a machine gun keeps spitting nail after nail, four hundred a minute. The instruments are almost uncanny in their human-like qualities, acting in a far more marvellous way than does the magician who entertains and mystifies us in the darkness of a theatre. For example, they will take a few strands of wire fed into metal hands on steel rollers and — presto! in another half second many kinds of barbed wire fencing appear ready to make barricades against wandering tramps and rest-

less cattle. Or again, watch a white-hot ingot two feet in diameter as it is suddenly seized by mammoth steel jaws, flattened, lengthened and passed on over rapidly moving iron rollers until it finally appears as the last word in steel rail construction. Every eight hours this machine turns out over four hundred tons of steel rails. Or come inside a huge pitcher-like building, a Bessemer furnace, the home of liquid steel. After the metal has been heated to the proper temperature, a stopper is removed, and little rivers of molten metal dash down in silver rapids. The glowing mass soon separates into two streams. The pure metal, which will harden into the finest steel, flows out under a metal dam; while the slag and impurities pour over the top into another reservoir.

One's admiration for the directing genius of the company increases; we should give due credit to the inventors and directors of such mechanisms, so fearfully and wonderfully made. Yet while fascinated by these processes, one becomes aware of human beings everywhere in the background who, one suspects, are largely responsible for the results obtained from the machines. We learn with amazement that there are five thousand of them in the Minnequa Steel



Plant alone. The handling of these men, their organization and direction, constitute the "human mechanics" of the business. The conditions surrounding the human factor determine to a large extent whether the corporation has a soul or is a mere machine for the production of goods, regardless of the welfare of human beings.

Of this human element, at this plant, Americans constitute a majority, while forty-five per cent. are Mexicans; the two groups together comprise ninety-seven per cent. of the working force. All of them have their life problems, their ambitions, their misfortunes, their longings, their homes — and a large number have their children. How does the industrial machine treat these thousands of toilers?

The records in the dispensary show that not more than twenty-five are injured a day and that most of these receive only minor casualties, such, for instance, as a speck in the eye. The machine is rather cruel to its masters but the record compares favorably with the best that our present industrial mechanism has yet been able to devise. Human workers are too careless and foolhardy to abolish accidents completely. The company has provided a splendid hospital and dispensary to care for the men and their relatives. In addition to the accident cases there average half a hundred others who bring their tales of affliction to the dispensary each day; ranging from colds to infectious diseases. Besides accepting medicines for themselves, they take away more for their friends. In matters of accident and disease, the human factor is admirably provided for.

The United States Steel Corporation has replied to her critics by continuing the twelve-hour day and the seven-day week. Other prominent corporations have attempted to settle the vexed question through the open shop drive. Among constructive solutions which do not attempt to deal directly with the labor unions, the plan of the Colorado Fuel and Iron Company merits attention. With the cooperation of company officials the writer visited their steel plant located at Pueblo, the concern which we have been describing. Later he took an automobile tour with the president's industrial representative through their mining properties. It was in this company that a strike resulted in the so-called Ludlow disaster of 1913 in which state troops and workers engaged in battle with heavy casualties, together with the burning of the strikers' tent colony. Out on the bare plains, far from any habitation, the United Mine Workers have erected an impressive monument to commemorate the men, women, and children who here lost their lives. These tragic incidents helped the company to inaugurate a plan of joint representation of employees and management which has been popularly called the "Rockefeller plan." It was adopted in 1915 by vote of the employees of the mines, and in 1916 by the employees of the steel works.

Briefly, it takes cognizance of the human mechanics of industry; recognizes the four parties to industry — labor, capital, management, and the community — and admits that relationships within the company should provide for the rights of each. In other words the plan tries to apply the a-b-c principles of industrial relationship: — contact, representation and cooperation.

The main points of the mechanism are quite simple.

Each division of steel plant or mine elects annually, by secret ballot, one representative for every one hundred and fifty employees. Those elected meet three times a year in district conferences with an equal number of men appointed by the president of the company, and once a year in a general conference with representatives from all the plants. Besides this each district has four committees composed of an equal number of the representatives of employees and the management. These are: the committee on cooperation, conciliation and wages; the committee on safety and accidents; the committee on sanitation, health and housing; and the committee on recreation and education.

The plan has now been in operation long enough for at least a preliminary estimate of its value. After touring from mine to mine, talking freely (and alone) with the miners, their representatives, and with strikers who are fighting the company, the writer believes the following to be a fair appraisal of the results achieved.

The elections are fairly held. In some instances there were complaints of company control, but the overwhelming majority seemed satisfied. The general method was to call a mass meeting to select the nominees and later, at the same meeting or on another day, to hold the election. Of course, each mine had its own custom about the precise plan of procedure. Many admitted that the chief problem was to interest a sufficient number of workers to vote, just as is often the case in the outside world of politics. Some voiced the belief that more should be done to acquaint the men with the facts about the elections and the necessity for their participation. Yet much has been done. During six years, one hundred and ninety persons have been elected to serve as employees' representatives and of this number one hundred and eleven are still in the company's employ. The workers do not give the men long terms, since one hundred and twenty served for one year only. They are of almost every nationality, average just over thirty-eight years of age, and have been with the concern for an average of twelve years.

Since its inauguration the system has provided an open channel for grievances. In our national government dissatisfied voters have their opportunity on election day. Similarly, under the representation plan a dissatisfied worker can approach his representative and demand satisfaction. The representative first takes up a complaint with the foreman and superintendent; then, if necessary, with the joint committee; after which it can be appealed to the president's industrial representative; and finally to the president himself.

During the first six months of 1922, there were 49 requests accepted (that is, settled in favor of the complainant) by the mine superintendents, while 22 were rejected; the president's industrial representative accepted 50 and rejected 37; the joint conference or joint committees accepted 145 and rejected 45; and one request was accepted and one rejected by the president. At the end of the six months 18 other questions were still pending. In this period, then, a total of 368 requests had been raised, of which 245 were accepted and 105 rejected. The particular problems dealt with are significant. Fifty-four per cent. involve working conditions, (improvements to protect employees and to facilitate their work); twenty per cent. living conditions, (mostly questions dealing with the maintenance or rental of company houses); 7 per cent. matters of



employment, (hiring or firing); 6 per cent. wages; 3 per cent. recreation; 2 per cent. medical help; while the rest were scattered.

It can readily be understood from all this that the plan is a cooperative mechanism between employers and workers which achieves results. An average of nearly two questions per day have been adjusted, over half of them through the joint conferences and joint committee meetings. Seventy-four per cent. of all the requests related to working or living conditions. And sixty-six and five-tenths per cent. of all those brought up by the employees were settled in their favor. The number still pending represent less than one per cent. and deal mostly with living conditions. The president's industrial representative in a letter dated July 27, 1922, states, "The need for extreme measures of economy account for some of the rejections and caused deliberate consideration of those which were not finally disposed of in the six months period."

It is apparent that the company has the last word in all questions and that its decision is final except that appeal may be made to the State Industrial Commission; but in any case there is an enormous advantage in having grievances frankly stated, discussed, and so far as possible, adjusted. If the Tsar of Russia had been willing to have open communication with his subjects, to permit the Duma to meet and discuss all questions that were troubling the people, he might still be in power. In a similar way any concern which frankly permits the employees to raise any questions they like and then settles them on the basis of joint discussion has gone a long way toward solving the human mechanics of industry.

Without considering the actual cases which come up for settlement, it is impossible to realize the extent of the advantages accruing to the workers from a plan of industrial representations. Let us consider concretely, a few of those taken up by the company superintendents. John Cortez, 17 years of age, complains that he has been discharged. Investigation discloses that he was no longer needed because a locomotive has displaced the mules which Cortez used to handle. He is assigned work clearing roads and assisting the masons, but this does not satisfy him; he is next offered a chance to dig coal with his father, an experienced miner, but he refuses and the case is closed.

At Primero, the miners complained regarding the weights received on their cars. A committee was authorized to be present when the inspector tested the scales and found them ten pounds too light. This case illustrates the advantages of the system. A real injustice was being done the men. Under the old autocratic boss method, their complaints might have gone unheeded while the injustice rankled in their minds until it caused an explosion. Under the new policy the matter is settled satisfactorily to all. Such a small improvement as the installation of ice cold drinking water in the iron department may prevent an enormous amount of potential friction.

Some decisions are settled against the men. For instance, Gus Carlson, adjuster in the field fence department, objected to being worked three days as an adjuster and three days as an operator. He preferred straight time as an operator. He was told, "It is to the best interest of the company to direct the working forces."

All the men seem to feel that the plan prevents the boss from arbitrarily discriminating against a man

or firing him. For example, Joe Cardo who was discharged for abusive language toward Craneman Stalling, took his case to the superintendent and was placed elsewhere. Foreman Shultz declared Joe Mignome was too slow and dangerous. Joe protested and investigation by representative Helm among the men on the foundry floor did not corroborate the charge; Mignome was retained at his task. Under the old policy of hire and fire, Joe would have a permanent grievance which might break forth into trouble in time of crisis.

To understand the type of questions considered at the Joint Conferences, let us take up a few of those settled by the last Trinidad Conference.

1.—A lighting arrangement was installed at the Morley railroad crossing.

2.—Porches were ordered constructed for the houses above Berwind.

3.—Charges for soft drinks at various Y. M. C. A.'s were adjusted to agree with prices in neighboring towns.

4.—Lights were ordered installed in the garages of the miners.

5.—Basements under tenant houses were ordered constructed at a cost of fifty thousand dollars.

6.—A request was made for the Santa Fe train to stop at a certain crossing.

7.—An increase in the bath room facilities at one of the mines was urged and adopted.

8.—The cost of board at a certain camp was made uniform with others elsewhere.

9.—The excessive cost of powder was discussed but the company explained that the slight profit now was only balancing money previously lost.

Each of these questions was taken up, discussed, and settled. Perhaps enough has been given to show the importance of the conference plan. It removes the gnawing sense of injustice which men feel over little things which can be corrected. In addition, it is the way to permanent improvements such as attractive homes for the workers, bath houses, club buildings, and splendid schools. In some places swimming pools have been installed. The contrast between the housing conditions in the Colorado Fuel and Iron Company properties where the houses are neat and the gardens thriving, and those of some other concerns where there are miserable shacks hardly fit for cattle to live in, is striking.

As a result of talking with representatives and men, the writer found the following general agreement as to the merits of the system:

1.—It brings the men, the foremen, and the superintendents together.

2.—All minor grievances are equitably settled.

3.—It has improved working and living conditions in the concrete ways we have enumerated above. "Today a man even makes the rounds to carry away our ashes," said one worker.

4.—Most of all, it prevents discrimination and graft on the part of the foremen. A man cannot be discharged without cause.

Against these advantages the following objections were raised:

1.—Men who are in the union will not give the plan a fair trial.

2.—Far too few employees take an interest in the plan.



3.—It provides no real method of settling wage disputes except by yielding to the company.

4.—The employees cannot bargain on a national scale; they have no fighting fund with which to enforce their demands, and must yield to the decision of the company or go elsewhere.

5.—The plan harms the union.

We have already considered in some detail the advantages of the plan. The most important objection, that it hurts the union, is serious because the labor union is the chief protection that the coal workers of America have against an unjust wage. Theoretically, the plan takes a position of absolute neutrality towards unions. It says, "There shall be no discrimination by the management or by any of the employees on account of membership in any union." It is one thing to have such a rule and another thing to enforce it. For example, in one of the mines a union representative urged his fellow employees to refuse a wage cut and to strike. Later, after sixteen of the men had gone out, he was informed that he would never be reemployed although the mine superintendent admitted his superiority as a coal miner. Instances of this kind could be multiplied. There are always some superintendents who do not live up to the spirit of a plan and it is hard to enforce the matter from above. Then, too, there is ever the difficulty of deciding how far a union man is justified in making propaganda against the company. Certain it is that the actual results of the plan have been such as to hurt the unions. In a conference of all the representatives from one district, the following statement went unchallenged, "Every man in this room would have been in the union had they not had the Rockefeller plan." In other words, all the representatives agreed that it had hurt the union by decreasing complaints and points of friction.

To a certain extent, however, this very charge is a testimonial to the success of the system in settling grievances, inaugurating better working conditions, and inculcating a more harmonious spirit between manufacturer and men.

From this study it is apparent that the Colorado Fuel and Iron Company have honestly tried to better relationships with their men. The first steps in contact, cooperation and representation have been taken. Officials of the United States Steel Corporation laugh at the plan as a joke; but the company's sincerity has been demonstrated by a seven years' trial and by the improvements already made, not the least of which has been the abolition of the twelve-hour day. Those who believe strongly in the unions, should nevertheless admit that every honest attempt to bring harmony into industrial relations is a step in advance. The Colorado Fuel and Iron Company are pioneering the way to something better than the old Tsarism of the United States Steel. In the seven years since they inaugurated the plan, four hundred different concerns, employing seven hundred and fifty thousand men, have put in similar plans.

It is a revolutionary movement. If conducted honestly, it provides opportunity for the workers to secure training in representation and initiative. It is not an impossibility that the very company union may some day take the bit in its own teeth and affiliate with organized labor. At the very least, it does accomplish constructive results in improving living and working conditions which too often the union as a fighting agency neglects.

America has achieved democracy on the political side; she is slowly struggling through unrest, strikes, and legislation to reach some form of industrial democracy. In our age every executive must sooner or later consider whether or not he has introduced into his own business even the rudimentary principles of the human mechanics of industry. Has he striven for contact with his employees, for representation, and for cooperation? The plan we have discussed is one of the honest experiments which have achieved good results and merits consideration as one road leading toward industrial peace.

### THE ST. LAWRENCE

A \$250,000 investigation, paid for by American capitalists, has been completed. The investigator was Hugh L. Cooper, the engineer responsible for the Keokuk and Muscle Shoals dams. The results appeared in a recent article in the Outlook, by Newton Feussle.

The river could supply 5,400,000 H.P. It could save 54,000,000 tons of coal annually, thus releasing \$550,000,000, now tied up in railroad property, for other uses. Its use would reduce the power bills of Canada and the United States \$189,000,000 per annum. Grain freight rates would be 6 to 10 cents less per bushel.

Colonel Cooper suggests the building of five dams, six locks and six miles of canal, thirty feet in depth, in the 120 miles between Ogdensburg and Montreal at a cost of \$1,250,000,000, roughly four times the cost of the Panama canal.

The great physical obstacle would be the ice which for a period of ten days each spring goes through at times at the rate of 675,000 tons per hour.

Today there are transported 44,000,000 tons of freight annually over the river. Canals would make possible the handling of 200,000,000 tons per season. Despite the fact that in 120 miles the river falls only 220 feet the cost is figured at \$17 per horse power per year, exclusive of taxes. This compares well with prices at Niagara, being in fact less than average costs from new installations, today.

It is submitted that power can now be commercially transmitted 400 miles and that the St. Lawrence development would thus affect, directly, fifty millions of people, quite regardless of the importance of deep water navigation from the lake ports to all parts of the world.

### RICH OIL SHALE IN ESTHONIA

In Esthonia, the little new republic just south of the Gulf of Finland, there are beds of oil shale of unusually high grade. The combustible matter ranges from 36 to 45 per cent. and distillation gives a yield of oil of about one-quarter the weight of the shale. Some small shale-oil plants were in operation during 1921 and 1922, and it is expected that large distillation works will be in operation shortly. The shale can be burned by itself, and has a calorific value about one-half that of the best coal. It is already used extensively as a domestic fuel, in gas works, and to fire cement mills.



# China Clay in Cornwall

AN INTERESTING VISIT TO THE CORNISH CLAY  
MINES OF MESSRS. H. D. POCHIN & CO., LTD.

By W. TRETHEWAY

A map of Cornwall showing the numerous China clay mines of the firm of Messrs. H. D. Pochin & Co., Ltd., is sufficient to demonstrate the wide-spread and important operations of this well-known firm. For the benefit of our readers I made a special visit to some of their China clay mining operations on a recent Saturday afternoon, and obtained quite a revelation of what sound business experience and a supervisory control, combined with the requisite resources of a well-established firm, can achieve. It will be impossible to trace with more than a small degree of exactness the progress and development of this world-famous firm even as far as it concerns the China clay industry. They are undoubtedly great architects in the commercial kingdom, and their large establishment with business tentacles in so many directions and in all parts of the world is practically the evolution of three ideals constantly pursued by this firm for more than a century. The first relates to the quality of the goods, the second, promptitude in despatch, and the third, the efficiency of their business system.

More than half a century ago the late Mr. H. D. Pochin discovered a process for the manufacture of aluminous cake using China clay as its chief ingredient. This new form of alumina, which became so largely used by paper makers throughout the world, proved a notable triumph for the firm, who were then more concerned in the manufacture of chemicals. The firm were even at that period fairly large consumers of China clay, but the demand for their aluminous cake exceeded their most hopeful expectation and necessitated the acquisition of their own China clay mines. As a result the famous Gothers Mine in the parish of St. Dennis was acquired in the early seventies. Gothers Mine at that period was but a small proposition for the firm of H. D. Pochin & Co., Ltd., and under the early direction of Mr. William Pochin the capacity of this mine was revolutionized. It was at Gothers that the gas engine for pumping and also for winding was first introduced, which is now rapidly usurping the place of the old Cornish steam pumping engines.

There are six very large drying kilns and the drags and tanks are ingeniously surveyed and constructed with a view to the elimination of all impurities as well

as effecting the utmost economy. Over 40 years ago a light railway was constructed linking up each of the kilns with the main line of railway, passing through a couple of miles of the famous Goss Moors owned by Lord Falmouth.

The storage capacity of clay ready for shipment at Gothers is nearly 6,000 tons, which enables the firm to accelerate large shipments when required, and represents nearly 60 years output of its earliest production.

An important expansion that followed was the acquisition of the Balleswidden and the Leswidden Mines in West Cornwall, and the extension of the loading facilities at the Penzance docks. At Parson's Park, situated north of Liskeard, the deposit has more than met the Company's anticipations. Here the appliances of production were brought up-to-date by the addition of a powerful water turbine and a gas engine. The mine is connected with a drying kiln at a distance of nine miles by an earthenware pipe line and is linked to the main Great Western Railway line at Liskeard and also with the Looe Railway, at which port the firm have secured private facilities for loading.

It was, however, subsequent changes that marked such a momentous era in the history of Messrs. H. D. Pochin & Co. Ltd., whereby their productive capacity in China clay alone approximated 200,000 tons per annum. This was the possession of Gunheath, a mine with a world-wide reputation, as well as South Caudledown, South Goovean and the Wheat Remfry China clay mines, together with several well known China stone quarries and grinding mills and also a valuable Ball Clay deposit at Mainbow and Newbridge in Devonshire. From whatever standpoint such enormous expansion is viewed, there are two characteristics, enterprise and energy, that seem to stand out as the hallmarks of the firm from its inception.

The cordial relations that exist between the firm and their employees have also contributed largely to the unobstructed progress reflected throughout their long commercial life. Messrs. H. D. Pochin & Co., Ltd., recognise that the men are quite as anxious as themselves to get to work and do their bit for the progress of the industry.



South Caudledown China Clay Mine



Although I have frequently been in the vicinity of the Gunheath Mine, this occasion was practically my first visit to the Works. This mine, which has had a great reputation for more than a century, had been in the possession of the Higman family who have been associated with the China clay industry for the past century. I was received at the works by Captain W. Kelbow, accompanied by Mr. J. W. Higman, Jr., who is a son of Mr. J. W. Higman, the former proprietor of the Gunheath Mine, and who, I was glad to observe, was fulfilling the highest traditions of an illustrious family and fully maintaining a *clarum et venerabile nomen* in the China clay industry of Cornwall. This mine has evidently been one of the bright spots throughout the period of trade depression. Its native blue clay, so adaptable for a variety of uses, has maintained such a steady demand that no slack time has been experienced by the clay-workers. During the reconstruction of the new dry micas and the pipe line connecting the micas with No. 2 and No. 4 kilns, the firm found employment for only 50 men, but now on completion they have returned to their normal engagement of 110 men. Mr. Higman informed me that the

installed in the pit, a 120 h.p. gas engine generating electricity for an electric motor-driven centrifugal pump which, with the Cornish engine, has a total pumping capacity of 1,800 gallons per minute. The winding of the whole of the sand is done by a 65 h.p. Campbell gas engine.

The clay is washed on the hydraulic system, which gives the highest satisfaction. As soon as the clay water reaches the surface its refining process is begun. First it passes through a series of "micas," which consist of from 15 to 20 troughs, about 1½ feet wide and 220 feet long, constructed of concrete, where the sand settles out. At the bottom the clay has to pass through a succession of very fine gauze traps, which eliminates floating impurities and foreign matter. From here the clay and water pass into settling tanks, where the clay slip settles to the bottom and is then filtered, while the supernatant water is drawn off. The old settling pits and tanks have been improved and several new ones constructed to provide the additional output required. These extensions and the new kilns have been built from the designs of the firm's own engineer.

The kilns are advantageously connected with the



Gothers Deep.

excellent brands produced at Gunheath were the G. H. and G. H. R. native blue clays and the H. D. P., a superior pottery clay. These have met with such great demand from the paper making, bleaching and pottery markets, both at home and abroad, that the productive capacity of 125 tons per day has been insufficient to meet requirements. Looking down into the pit from the old engine house one is induced to ask why a larger hole had not been made after nearly a century's working.

There can be little if any anxiety entertained by Messrs. H. D. Pochin & Co., Ltd., regarding the future of their enterprise as the clay is known to exist far beyond the present workings, and even if the demand were doubled or trebled the deposit would not be exhausted within a measurable term of years.

The equipment of this mine includes some of the newest, as well as some well-tried engines. In addition to the large Cornish engine, erected in 1847, there is

railway line and Gunheath forms the terminus of the Bugle and Stenalees branch of the Great Western Railway.

Acting upon the special request of Mr. David T. Taylor, the General Manager, who is following in the best traditions of the firm, I accepted the invitation to see the South Caudledown Mine, about a mile distant. This mine, although more famous than Gunheath on the point of quality, presents quite a different problem to the proprietors, which, however, they are undertaking with their characteristic energy. This pit is hard to describe. It resembles a white ravine penetrating to a great depth and is long and narrow. It is bounded on one side by granite dykes of large dimensions, rendering the extraction of the clay concealed underneath an unenviable task. Mr. Higman informed me that the development of this mine was an expensive proposition but the firm were determined to use their best endeavours to make it a success. The



Gunheath Pit

# Humidification

A PROPONENT OF STONE DUSTING IN COAL MINES DESCRIBES ITS USE

BY JAMES ASHWORTH

This subject and its application to the coal mines on this continent appears to arouse almost continuous discussion amongst the engineers whose duty it is to make coal mining as safe as it is possible to make it.

The latest addition to the voluminous literature that has been printed in the engineering and mining journals and in the transactions of institutes and societies devoted to mining, is a paper entitled "Economical Humidification". This was contributed to the Coal Mining Institute of America, and although like the work of many other authors, no useful suggestions are made, yet it proves that the subject in its practical aspects is not by any means devoid of points of great importance. The author has, however, wasted his energies in an endeavor to show that he can conserve or economise the heat of steam humidification by passing it through the goaf of a coal mine. The writer of this article does not propose to criticise all the author's suggestions, but only to state his conclusion that any such conservation of heat is entirely visionary and impossible, because there is no possibility of finding in any coal mine on this continent goaf hot enough to prevent the condensation of steam, nor yet preserve its latent heat. It will be obvious to any student, or to any one practically acquainted with the management of coal mines, that there are a host of reasons why these suggestions are totally impracticable.

## *Use of Water Made Compulsory*

Before discussing the general subject of humidification, it may be useful to ascertain what is the present and past history of this detail of colliery management. Many years ago, coal mining officials thought that firedamp was the principal danger that had to be provided against, but as years passed by it began to be realized that there was another danger, and that danger was coal dust. Many, many more years have since been devoted by scientists and observant men connected with coal mining to experiments showing the great and unrecognized danger which is caused by the presence of fine coal dust in mines. Even at the present day, we cannot say that this danger is universally recognized.

Eventually, it was recognized by the British Government that there was a lurking danger which in ad-

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narrowness of the pit precludes the use of the usual winding operations for the present, but arrangements are being made for its ultimate adoption. Here again the inventive mind has been active and this mine was the first to adopt the Blondin method of removing overburden. The deep brands of clay produced at South Caudledown are in greater demand than can be provided, both among the paper and higher grade pottery manufacturers.

The destinies of this large group of China clay mines are in the capable hands of the Chairman, the Hon. H. D. McLaren, C.B.E., M.P., and the Managing Director, Mr. H. Stanley Pochin, J.P., whose guiding influence and inspiring genius are followed with great interest by the whole community.

dition to firedamp was accountable for many great disasters in collieries, and that this danger was not provided against by ventilation and the regulations then in force for the safe working of collieries. Consequently, a Royal Commission was appointed to report on the Prevention of Explosions from Coal Dust in Coal Mines. This commission eventually reported that applications of water were the best preventive, and ultimately the laws governing the safety of mines made watering compulsory. At that time the amount of water used and the form in which it was to be applied were not fixed by law; consequently some mines were dampened and others, such as mines 1,500 feet deep or deeper, were not artificially watered. In the latter cases it was found that the miners could not work with efficiency unless the ventilating current of air was kept as dry as possible. A proof of this was obtained when two members of the Coal Dust Commission went down into the deep mine at Pendleton and had a bucket of water thrown over the coal that was being got on the inbye side of them. This rendered the air so moist that it seriously inconvenienced them, and demonstrated that watering was an impossible safeguard in such cases. Further, it has been proved by a well known authority on the rate of explosion in mixtures of explosive gases and air (Prof. H. Dixon) that the most violent explosions occurred when the mixtures contained 25 per cent. of moisture, that is when the moisture was in the form of steam. These experiments, therefore, indicate that any moistening of the air of a coal mine as a means of safeguarding it against the propagation of the flame of an explosion, must be in excess of 25 per cent.

## *Water of Limited Value Only*

With these provings and facts clearly set before coal mining officials, the writer of this article cannot see why so many people connected with the science of mining still insist that there is a safety value in any form of dampening or humidifying the ventilation current of a coal mine.

If, further proof of the limited value of water as a protection against the initiation of firedamp or coal dust explosion or for the arresting and limitation of the extent of an explosion, we only need to study the records of the very large number of experiments made under pit conditions in England, France and other countries in Europe to find that the use of water cannot be depended on as a safeguard. Again, the very long and careful experiments made by the United States Bureau of Mines at Bruceston proved that where mines are to be safeguarded by applications of water, they must have it applied in such generous quantities that the coal dust when taken up in handfuls is so saturated that water may be squeezed out of it. These conclusions, when stated in percentages, mean that not less than 53 per cent. water must be mixed with the dust throughout a coal mine to render it in any sense a safe mine, particularly where the coal is mined by coal cutters and where the coal is broken down by the use of large charges of explosive, no matter whether it is by a permitted or black powder explosive. This conclusion is irrespective of whether or not the



ventilation of the mine is suspended during the time when shots are being fired.

### *The Utility of Stone Dust*

In England and elsewhere, after the use of water had been extensively adopted as a safety provision, it was plainly demonstrated that water was not a true safeguard and that great disasters still occurred. These disasters were unmistakable evidence that something more practical and effective than water was urgently required. The discovery was then made that if very fine, non-inflammable stone dust were distributed on the roof, sides and floor of the haulage roads in such quantities that it became mixed with the coal dust to the extent of 50 per cent., it then became a protection against both the initiation of an explosion and also a means of arresting the flame of an explosion.

The protective value of non-inflammable stone dust is greatest when it is floating in the air, and thus where some engineers use a dampening arrangement in addition to stone dust, the protective value of the stone dust is probably lessened as there is a tendency for both the coal and the stone dust to separate out of the air and fall to the floor. In this regard, it is believed to be practicable to lessen the quantity of stone dust floating in the air by dividing the mines into zones where shelves containing large quantities of stone dust are so placed, and balanced, that on being disturbed by vibration they deliver their contents into the passing air current and thus limit the extent of the flame of an explosion.

Experimental tests made with safety zones arranged as above appear to have given very satisfactory practical results, but they have not yet displaced the use of water.

### *Uniform Regulations Suggested*

The United States of America possesses a most valuable scientific and practical department at Washington known as the Bureau of Mines, but its work and

discoveries with regard to the economical and safe working of mines is not reflected, to the extent it ought to be, in all the States of the Union. Thus each state has its own code of rules for the regulation of mines, and it appears to the writer that the safety of coal mines throughout the States of the Union might be vastly increased if the rules in force in all States were consolidated by an Act of Congress. The same conclusion applies to Canada.

A drastic consolidation such as this would without doubt increase the safety of mines, and the valuable work of the Bureau of Mines would be brought into effect with rules for safeguarding coal mines against coal dust dangers, whether by humidification or by non-inflammable stone dust, or by both together, and also the use of explosives and the lighting of mines would be placed on a firm basis. "Safety First" would thus become something practical and the fallibility of man reduced to a minimum.

In conclusion, the writer would rejoice to hear that some energetic member of our governmental body had taken up this subject with a vim, and that a code of rules applicable to all our provinces had been compiled and brought into daily and hourly effect.

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Since this article was written two very serious explosions have occurred, one at Dawson, New Mexico, and the other at Cumberland, British Columbia. At both these mines there have been previous fatal disasters and clearly whatever protective means have been applied to prevent or restrict the extent of an explosion, they have proved an entire failure. Both these cases and others that have previously and recently occurred emphasise the fact that humidification as a protection against the extent of either a firedamp or coal dust explosion or both combined has proved an entire failure. The case demands the Legislative and Engineering attention of all the coal mining States of the United States of America and also of Canada.

## News and Comments

BY ALEXANDER GRAY

### *They Were "Astounded" — And So Are We!*

Clearing the hurdles, taking everything there is in the obstacle race with a rush, *The Montreal Star* commented on the gold returns from Northern Ontario, by displaying this—

### *"CANADA IS NEARING RAND GOLD OUTPUT"*

There are those who may proceed upon this information and load up with a bushel or two of "securities." The pre-ordained objective being within reach, according to headline writers, it is a quite inconsiderable matter that South Africa is just celebrating its £1,000,000,000, golden achievement. Nor is it necessary to put the actual facts "under the glass." The editor who went pole-vaulting landed in a manner pleasing to the most optimistic. If there is any doubt about it the linotype operator was at fault—for not having made it a little stronger.

Last year Canada is credited with having yielded £5,300,000 in gold; the Transvaal, £29,800,000. Forty days having intervened, it became a matter of easy

assumption to extend Canada's 17.77 per cent. of the Rand total in a year of prolonged strikes, to within a trifle of the Rand production. This is not at all astounding, considering a recent prospectus suggesting that one Porcupine prodigy had ore that meant a daily production of \$4,500,000. Working 300 days at that rate would give \$1,350,000,000; so one mine (if nothing interrupted operations) may in five years make Rand pretensions to pre-eminence look like a second rate reminiscence!

Mr. Brigham, shedding effulgence and aiming to be deliciously sanguine, was quoted as surmising "there may be a hundred Hollingers here, for all we know." Keeping in reserve the hypothetical \$27,000,000,000 possible from Labrador, it is feared a section of the laity and their editors may indulge in under-estimations. Nor are we alone in our apprehensions in this respect, since James H. Curle visited Northern Ontario, aroused London, then started for Nyassa, incidentally dropping in on Johannesburg, and invited this, which appeared in *The African World*.



"After astounding his old pals in the Golden City, with his view on the immense wealth of Ontario, Mr. Curle left the Rand for Nyassaland, where no mines have been discovered yet—but—"

#### *A Globe-Trotter's Shrewd Opinion*

Here in Canada there is satiety; yonder Mr. Curle planted comingled suspense, astonishment, and (we hope) a perfectly laudable purpose to convince "the Groups" that the pre-Cambrian formation has the wealth-giving attributes of their unique banket—those pebble beds that contributed gold at the rate of nearly £30,000,000 for 1922. To have Mr. Curle do this where the Gold Mining Aristocracy was, and is, supreme, may have been "astounding." He is a very frank person. For many years the pains and pleasures of his comments have permeated all gold fields. As a Commissioner of the Empire he has flitted to and from all quarters of the globe—lately in Northern Ontario, today in equatorial Africa—and the solidity of his reasoning never has been gainsaid. The author of "Gold Mines of the World," having roamed at will, never has been a constructive critic, sufficiently detached to have an open opinion and to be able to express it.

Dismissing the slight miscalculation of *The Star*, and making due acknowledge to the Rand for its unparalleled performances, it is significant that the London Editor quoted employed the past participle, which, accurately conjugated, brings satisfaction to those who look to the Rand Magnates, so-called, for participation in Canadian developments. The astonishment occasioned by Mr. Curle, no doubt was all the greater because he is a weigher of words. It was characteristic of him to drop around to Goldopolis and "sound the loud timbrel" at the witching hour when the "Corner House," Gold Fields, Consolidated Investment, General Mining and the other abodes of influential Central Administrations are more amenable than they used to be to outside suggestions. Yet it is almost incredible that Mr. Curle's old pals were "astounded," in view of their wonted imperturbability. Conceding how surprising it is to have it emblazoned "along the Reef" that Ontario for the next twenty years will be the most attractive gold country, it is highly improbable that the chief factors at the Rand are uninformed as to what is transpiring at the Canadian gold fields. What Mr. Curle said may make them more receptive and bring their card index up to date. If they have not bestirred themselves hereabouts, it is not because of defective intelligence maps. They are the most avid of the species; they foresee gradual recession in their aggregate output; if they are aloof the blame therefor does not rest with them alone.

One of these days the London-South African Groups will take Canada more seriously, and Canada will accord more favorable terms to them. Mr. Curle has helped to broaden the horizon, without asserting the Rand will have a rival. And here it may be parenthetically noted that the Rand was so constituted that it was financed on a premium basis, whereas western precedents adhered to the discounts deemed essential in hasty financing. As a rule, Rand mining principals do the discounting to start with; but they taught others the worth of gold fields, and it is an exaggeration to say that they or any of their compeers were "astounded" by the statements of Mr. Curle.

#### *The London Viewpoint*

Apart from the mingled feelings attributable to Mr. Curle, it is more "astounding" to have him bestow his

fulsome tributes upon the Northland, and to do it unreservedly. It is almost twenty years since he jarred my tympani. Chatting with him in London Wall during one of these periods when he was not boxing the compass, I was expounding the superlative qualities of the Rand, contending that the deep depths and extensions east and west left no room for doubting. The man, whose nervous organization at the moment was giving anxiety to his intimates, curtly remarked "Oh, you have lived in the Colonies too long!" In other words, one had to change his environment, travel, and "take the air" in "the City" betimes, in order to have the right perspective, to get rid of provincial optimisms.

No more comprehensive observer ever went on survey. We may not coincide with him and think this is a small universe outside of London, from whence and to which all roads lead, where propositions from the four quarters of the world are daily proffered. So and so many proposals always are at flood tide in London. Lotharios from everywhere reckon themselves to be irresistible, but the Old Lady of Threadneedle street is discriminating. Consequently, when suits are pressed too strong, the claimants for favors meet the undisguised reproof:

"Oh, you have lived in the Colonies too long!"

There is something in that comment, when it comes from the methodically constructive and economically conservative, who are willing to frolic with funds without dissipating them. When all is said and done, and cooling processes have been applied, London and what it represents have provided the greater portion of the world's working capital, by scientifically taking the world at its worth. That and no more is what Canada should maintain as a policy. Canada desires to be invited to tender on sound bases, and not to have it felt between Bishopsgate street and the Bank, Cannon street and Moorgate, that the third table is reserved for London. Mr. Curle is as "cold" as the proverbial "chastity." Canada is indebted to him for his dispassionate propaganda, voluntary and disinterested and on other than economic account. It remains to organize forces that will be mutually compensatory.

#### THE NEW MONTANA OIL FIELD

One of the papers to be presented this week at the New York meeting of the A. I. M. M. E. deals with the Sunbrust-Kevin oil field in Montana, just south of the border at Coutts, Alberta. There are now 29 wells producing oil, and six gas wells. There have been 6 dry holes, and 4 at present dry that may produce. Thirty wells are in course of drilling.

There are two producing horizons, the Kootenai and the Ellis, and the production per day at present is 2,200 barrels. The possible productive area is 212 square miles.

#### RAND WATER SUPPLY

The supply of water for the Rand, South Africa, has always been a difficult problem. It has now been adequately provided for by a dam of the barrage type, 1,400 feet long, across the Vaal River 25 miles below Vereeniging, which has recently been completed. The flow of the Vaal river varies extremely with the seasons. The dam will back up the river for a distance of 40 miles, and provides a reservoir holding a maximum of 13,633 million gallons, the maximum depth being 25 feet at the dam. The dam and the superimposed bridge have cost £477,000.



## PROGRESS IN CANADIAN WATER POWER DEVELOPMENT\*

One of Canada's greatest resources is comprised in its wealth of water powers. In this respect the Dominion takes second place only to the United States in the extent of power available, maintains the same relative position in horse-power available per capita of population, following Norway, and again occupies the second place after the Scandinavian country in per capita hydro development. The development of Canadian water-power resources has been a prominent feature of national progress in recent years, and probably no other industrial factor has been so largely responsible for the employment of capital and indirectly for the development of other industries. The bearing of Canada's great water-power resources upon the future manufacturing status of the country is significant and is rapidly transforming the Dominion from a country almost wholly agricultural to one in which manufacturing interests are of great and growing importance.

There has just been published by the Dominion Water Power Branch a further and up-to-date statement of water-power development in Canada, covering the period up to November 1st, 1922, and this reveals the substantial progress effected in the past few years in hydro development in all parts of Canada and the greater part Canada's water-powers have, in the last decade, come to play in the Dominion's industrial life. The recorded power available throughout the Dominion, under conditions of ordinary minimum flow, is 18,255,000 h.p. The water-power available under estimated flow for maximum development, i.e., dependable for at least six months of the year, is 32,076,000 h.p.

An analysis of the water-power plants scattered from coast to coast gives an average machine installation of 30 p.c. greater than the six month flow maximum power. Applying this, it becomes apparent that the at present recorded water-power resources of the Dominion will permit of a turbine installation of 41,700,000 h.p. In other words, the present turbine installation represents only 7 per cent. of the present recorded water-power resources.

### *Recent Progress*

During the year 1921 the readjustment of values following war-time inflation made substantial progress, but necessarily brought in its train many business and financial difficulties and a lack of confidence in trading circles generally which led to a reluctance of capital to embark upon new enterprise. It is a remarkable fact, however, that the hydro-electric industry, though naturally affected by the general depression, suffered no set-back, and in fact the horse-power installed during 1921, 300,000 h.p., stamps 1921 as one of the most progressive years in Canadian water-power history.

The 2,269,659 h.p. at present installed throughout the Dominion is apportioned to the following uses. A total of 2,164,870 h.p. in central electric stations for general distribution purposes, such as the operation of street railways, operation of mines, operation of electro-chemical and electro-metallurgical industries,

operation of pulp and paper mills and for general industrial, municipal, and domestic use. A total of 489,228 h.p. is installed in pulp and paper mills. In addition there is used in the pulp and paper industry 160,577 h.p. purchased from the central electric station installation. A total of 320,561 h.p. is installed in industries other than central electric stations and pulp and paper mills. The total installation for the Dominion averages 338 h.p. per thousand population, a figure which places Canada second only to Norway in the per capita utilization of water-power among the countries of the world.

### *Central Station Industry*

By far the most important use to which development of water-power has been applied in Canada has been in connection with the central electric station industry. The extent of this industry and the important relationship which power bears to it is measured by the fact that 97.2 per cent of the power actually generated is developed by the use of water-power and that there is now invested some \$501,400,000 in hydro-electric plants and systems engaged in the production, transmission, and distribution of electrical energy for sale.

Throughout the Dominion there are 269 hydro-electric central stations with an installed turbine capacity of 2,164,870 h.p. or a generator installation of 1,633,140 k.v.a. It is of interest to note that of this total turbine capacity 1,501,491 h.p. is installed in commercial or privately owned stations, while 663,379 h.p. is installed in municipal or publicly owned stations.

### *Past and Future Growth*

It is interesting to note the growth of water-power development in Canada during the past decade. Since 1910 the total installation has grown from 975,000 h.p. to 2,970,000 h.p.; the central station installation from 605,000 to 2,165,000 h.p.; and the pulp and paper installation from 191,000 to 484,000 h.p. The average yearly increment in the past decade has been in excess of 180,000 h.p. installation.

Should the rate of water-wheel installation during the past twelve years be maintained there will be installed in 1925, 3,360,000 h.p.; in 1930, 4,110,000 h.p.; in 1935, 4,860,000 h.p.; and in 1940, 5,600,000 h.p. In view of the increasing appreciation of the advantages of hydro-power, combined with the fortunate location of ample supplies within easy transmission distance of the industrial centres throughout the Dominion, there is every reason to anticipate that this rate of growth in utilization will be accelerated rather than retarded. This will not seriously reduce the total reserves, for Canada possesses sufficient reserves to meet all anticipated demands for many years to come.

The water-power now developed in Canada represents an investment of over \$620,000,000. In 1940, should the rate of growth outlined be maintained, this investment will have grown to well over \$1,100,000,000. The present development represents an annual equivalent of 26,700,000 tons of coal, which, valued at \$10 per ton, represents a total value of \$267,000,000. In the year 1940, these annual figures will, with the foregoing assumption, have become 50,000,000 tons and \$500,000,000. The figures are striking evidence of the outstanding importance and necessity of an intelligent administration and development of Canada's water-power resources.

\* From "Agricultural and Industrial Progress in Canada".



# The Mining Districts

BY THE JOURNAL'S CORRESPONDENTS

## NORTHERN ONTARIO

**POWER TROUBLES.**—Power company troubles seem to be very much to the fore these days and mine operators in both Kirkland and Porcupine are complaining. In Kirkland operators claim that they are paying \$65 and \$70 for power with very frequent interruptions to the service, while the price charged in Cobalt and Porcupine is only \$50 a horse power year. They also complain of the clause in the contract that binds the mine during its life but does not bind the power company to supply power, and does not obligate the power company to provide for increasing needs. The capacity of the present line is only 5000 horsepower and the present consumption is about 3000; but with the proposed increases at the Lake Shore and Wright-Hargreaves its capacity will be taxed.

In Porcupine the low water and shortage of storage facilities have necessitated another cut to the consumers and although steam plants are being used to the limit of their capacity the producing mines will have to curtail either output or development work. The Sandy Falls plant on the Matagama river is not yet ready so that the mines will be short of power until after the spring thaws. During the coming season the Northern Canada Power Company will proceed with extensive developments at an estimated cost of \$1,250,000 which it is hoped will remedy the situation next winter.

In the meantime the Hollinger fight to secure power rights goes merrily on and despite the official announcement made a short time ago that rights had been secured at Island Falls on the Abitibi River, it is learned that this is not the case. The Abitibi Power and Paper Company state that their lease gives them the right to develop power and storage on the Abitibi River and that the company has received no notification from the Ontario government of any change in the terms of the lease. The Abitibi lease would have to be changed if the Hollinger were granted the terms it demanded. There is plenty of power on the Abitibi river for everybody, if it is properly handled, and people familiar with the situation are wondering if the Hollinger's anxiety for power on the Abitibi on its own terms, is not related to some far-sighted scheme which is not immediately concerned with mine requirements. The Northern Canada Power Company has an action pending against the Hollinger for the enforcement of a contract for the full requirements of the mine and it seems doubtful whether, even if the lease were obtained, power construction for mine purposes could be started until after this suit is disposed of.

**PROGRESS AT INDIAN CHUTES.**—Between 500 and 600 men are at work on the plant and transmission line of the Great Northern Power Company at Indian Chutes on the Montreal River and it is hoped to have the power in Porcupine by the end of May. The Davidson Mine, promoted by the same interests that are behind the Power Company, has contracted for this power and will not start underground work again until it is ready for use. Recent reports of diamond drilling on the Davidson show good values at 1700 feet, which is the deepest drilling done from the surface in Porcupine.

**MATACHEWAN.**—The British Matachewan Gold Mine has taken over a number of properties in the district and amalgamated them into one company. Considerable work has been done on one of these properties and some promising veins were found. The company also expects to take power from the Great Northern Power Company and it is anticipated that work will be started when power is available. Arrangements are being made to float the stock of this new company, in which case no doubt the public will as usual be asked to put up the money for a minority interest.

**PORCUPINE.**—Porcupine production increased during January, the Dome output for the month being over \$400,000. In the recent action brought by the Digby Dome, which owns adjoining ground, to restrain the Dome from putting tailings on the Digby land and to order the removal of those already there, the court granted an injunction, to come into effect in thirty days, prohibiting the placing of tailings on the plaintiffs' property. The court refused, however, to order the removal of tailings on the ground, but ordered a reference before the master in Brantford to determine the compensation. Application has been made before the Mining Commissioner for permission to deposit tailings on the Digby ground and this will be heard shortly. This Commissioner's judgment may be appealed and in the meantime the Dome will have to take measures before 30 days to see that no tailings are deposited. The amount of Digby ground at present covered by tailings is about twenty-five acres, and on account of the conditions it is very difficult to prevent slimes from depositing, and it will be almost impossible when the spring break-up comes.

The McIntyre has opened up new ore in a crosscut from the 1875-foot level. Assays are reported to run between \$30 and \$40 across 10 feet. The company is now getting the advantage of higher mill heads, which in January were about \$12 a ton. The option on the balance of the McIntyre treasury stock, held by New York Interests, will expire in a few weeks and it is anticipated that the stock will be taken up. The option price is \$15 a share and would result in \$1,000,000 being placed in the McIntyre treasury.

**KIRKLAND.**—The Lake Shore mine has decided to erect a steel head-frame 75 feet high as part of the proposed programme of enlargement. It is expected that in March construction of a 300-ton mill will be started, which it is expected will be placed in operation before the end of the year. Although sinking has not yet been started below the 600-foot level, the results of mine development have been very satisfactory.

The annual report of the Wright-Hargreaves for the year 1922 shows a gross production of \$762,752 and net profits of \$344,630 which is the largest output and profit of any mine in the Kirkland camp since mining was started in that district. The average recovery was \$11.52 a ton and the costs were \$6.31 a ton. The mill treated 205 tons a day or total of 66,181 tons for the year, and while ore reserves are not given, there are over 33,000 tons broken in the stopes. The report mentions the probability of an increase in the mill capacity when the shaft has reached the 1000-foot level. At the end of the year it was down 865 feet and sinking is



being continued. During the year dividends amounting to \$412,000 were paid and provision is made in the financial statement for the dividend paid in January. Current assets as of Dec. 31st. are \$274,125 and current liabilities \$108,414, while the surplus is \$6,424.

### BRITISH COLUMBIA

**THE CUMBERLAND MINE EXPLOSION.**—The explosion at No. 4 Mine, Canadian Collieries (D) Ltd., Vancouver Island, has overshadowed all other events of the past week. Thirty-three bodies have been recovered at time of writing and latest advices are that there are two underground still. It is known that fourteen white miners are dead. Of these nine were married, leaving thirty-one children of tender years, and five were unmarried. There are four married men in the hospital with good prospects of recovery. Nineteen of the dead accounted for are Chinamen.

Anything that may be said of the cause of the outbreak at present would be pure speculation. The deadly afterdamp is what caught, with fatal results, the majority of those whose names are on the death roll. The gas overtook its victims as they hurried to



Portal of No. 4 Mine, Cumberland, B. C., where Fatal Explosion Occurred.

safety, in one case fourteen bodies being found lying within a short distance one of the other. Experience and presence of mind saved James Finfold, who led fifteen Chinese through a maze of workings past the danger zone into the clean air of the main tunnel. Six Oriental miners refused to heed his warning and, taking a more direct route, were asphyxiated. Robert Walker, one of a rescue party, had a narrow escape. He was picked up unconscious with his head over a pool of water by men whose work was being personally directed by Charles Graham, District Superintendent of the Canadian Collieries.

No. 4 Mine, Canadian Collieries, is situated about two miles from the town of Cumberland and consists of two slopes with one main entrance. These slopes diverge at a point 75 feet distant from the main portal. No. 1 Slope is 7,000 feet in length, running due North. No. 2 Slope is 9,000 feet in length and runs North, 45 degrees East, being driven on the full dip of the seam. This results in its workings being the deepest of the mine. Levels are turned off this slope in an easterly and westerly direction, the lowest levels being Nos. 20-east and 20-west.

In longwall district, off No. 20-east level, No. 2 slope, an explosion occurred on the 30th of August last,

eighteen men losing their lives. The investigation that followed indicated that in this instance ignition was caused "by an arc in the electric trailing cable at the connecting socket used in connecting this cable with the main electric circuit." It also was stated that "it was a small explosion to take such a heavy toll ... Occurring on the longwall face it naturally brought a number of men in the path of the flame in a short distance. Owing to most of these men being engaged working on the face, and the seam not being very high, there was no way of escaping the flame."

The last explosion, it seems from reports thus far to hand, had its origin somewhere in No. 15-west level of No. 1 slope. This, of course, is an entirely different part of the mine from that affected by the catastrophe of five months ago. From the fact, however, that few of those killed appear to have been severely burned, it would seem that there is the similarity between this and the previous explosion, that the death list is out of proportion to the violence of the outbreak.

More specific information as to the cause, or causes, will have to wait on the report of Mr. George Wilkinson, former Chief Inspector of British Columbia, who was appointed immediately by the Hon. Wm. Sloan, Minister of Mines, to visit the scene and to make a personal investigation and submit a statement of his findings at the earliest possible date. With Mr. Wilkinson is Mr. James Dixon, Acting Chief Inspector, who is also charged to make an exhaustive inquiry, and who is assisted by Thos. R. Jackson, the District Inspector of Mines. It may be said incidentally that Mr. Jackson has made the statement that he visited the workings affected on the 29th of January last, finding no explosive gas and the working conditions good.

A word must be said in commendation of the splendid work of Rescue Crews. The men were quick to respond to the call for help. All during the night following the explosion they labored, never ceasing until all who had been underground were accounted for and there was no further chance of saving life. The facilities of the Government Rescue Station, as well as the equipment of the Company, were at their command. Thomas Graham, General Superintendent and Charles Graham, District Superintendent, did their utmost to assist. It is fitting, too, that acknowledgment be made of the offer of aid volunteered by the United States Bureau of Mines, Mine Rescue Officer Schoning of the Washington State Station having been instructed to proceed with men and equipment should his services be required. Although it was not necessary to take advantage of this evidence of international good-will, the spirit prompting the action was much appreciated by officials of the Mines Department of the Province.

The immediate distress of bereaved families was relieved from Provincial Government funds and those who were left without support will be taken care of under the Workmen's Compensation Act.

The Imperial Mineral Resources Bureau has published a 31-page report on *Aluminum (including Bauxite and Cryolite)*, which is composed of world statistics, 1919-1921, of these materials and compounds such as alum. The report can be obtained for 1s. 1½d. post free from H. M. Stationery Office, Imperial House, Kingsway, London, W. C. 2, or from the British Commonwealth Publishers, Ltd., in Montreal, Toronto, Ottawa and Winnipeg.



## NOVA SCOTIA

**THE STEEL PLANT STRIKE.**—The violent Labor agitation carried on among the Sydney steel workers during the last six months reached a sudden climax on the 13th. instant, when a steel worker refused to obey orders and was discharged. Without the least regard for the property of the Company or their own future employment the blast-furnace crew and others walked off the works right after McNeil, the man who was dismissed. The following day the strike was in full effect, and all departments were closed down. The Company succeeded in slowing down the coke ovens and will have sufficient men to keep these heated. The open-hearth and blast-furnaces were banked, but only with great effort on the part of the officials and a few faithful employees. If the workmen of this plant had been able to carry out their intentions, almost irreparable damage would have been done to the blast-furnaces and coke ovens, and unemployment for the next two years, at least, would have been general.

The Sydney steel works takes four thousand tons of coal per day, and while the strike continues, the collieries will be affected to this extent.

The following was a statement issued by the Dominion Iron & Steel Company, setting forth the case:

"At the meeting this afternoon with a committee representing the striking employees, Sydney McNeil admitted stopping some machines and ordering other helpers to stop theirs. The committee further admitted that McNeil refused to comply with the superintendent's instructions to start up his machines, and they claim that McNeil, a union representative, had the right to order these machines stopped. Superintendent Bischoff stated that on the men's own statement McNeil's dismissal was justified, and what the committee was asking was that the company should submit to outside persons its right to discharge an employee for good and sufficient cause."

According to the statement of the foreman, the discharged workman not only refused duty himself and hindered others, but was most defiant in his attitude. And yet the steel workers organization seems to be willing to stake its reputation on the outcome of such a discredited case. In such circumstances no labor union can hope to succeed, for the success of all labor organizations depends upon the control of the membership and a reasonable attitude towards the employer. Discipline there must be, and the glaring flagrance of this case sweeps aside all attempts at justification. The men's representatives openly declare that insolence to an employer by an employee is right and may only be resented at the peril of shutting down the whole works. The success of such a strike, at the cost of common civility to say nothing of the triumph of insubordination, would be the death of all organized industry.

That several thousand workmen should get behind an action that is condemned as soon as heard, is almost incredible; yet we seem to be living in an age when wild deeds and insensate language are cheered by the very men on whom they react most, robbing them of their contentment of mind, starving their bodies, and blighting their homes.

The strike cannot succeed; it is doomed the failure from the very beginning: and no matter how long it may last the baleful shadows will continue to deepen into the darkness and despair of a lost cause.

Intimidation does not adequately describe the work

of pickets at the steel plant. Like all bodies of men badly organized and led by irresponsible leaders, things have been done that in larger centres would not be tolerated under any condition. Railway trains have been held up and searched, the locomotive detached from the cars, auto trucks and other vehicles have been stopped, office workers, stenographers and officials forcibly turned back by bands of workmen carrying clubs.

**MR. HERD'S STUDIES IN BRITAIN.**—Mr. Walter Herd, mining engineer of the Dominion Coal Company, has returned from a business trip to the collieries of Great Britain. While there he paid special attention to mine loading conveyors, as used in the long-wall collieries. He reports that these are very successful and greatly reduce hand labor by the loaders of coal, who perform the hardest work to be done in a coal mine.

Coal loading conveyors were introduced into the Dominion Collieries some years ago, but on account of their great length it was difficult to get them round the short turns of a mine road, and consequently they were discarded before they had been rightly tried out. Since that time it has been growing harder and harder to get loaders for a coal mine, and the Dominion Coal Company put one of these conveyors into Jubilee Colliery, where it is giving first rate results. A great improvement has been made in the construction of the conveyors since they were first introduced, and it may be stated that before long numbers of them will be in use in every Cape Breton coal mine.

Mr. Herd also gave special attention to some methods of long-wall, especially those which might be found adapted to the coal seams of Cape Breton. Princess Colliery, Sydney Mines, is now partially under that system, but it seems difficult to get sufficient skilled labor trained to make a success of their method.

The drawing of all timber, according to Mr. Herd, is most essential to successful long-wall methods. This requires experienced men, and as yet there are few of these in Nova Scotia. Mr. Herd states that in some of the Yorkshire collieries not one prop is permitted to remain in the waste workings, and sums of money far beyond the value of a pit prop are often spent to have one of these removed, that a clean break may take place when the roof is settling down behind and near the face.

**THE RETIRING AND INCOMING DEPUTY MINISTERS.**—The Government Coal Mine Inspectors gathered in Halifax lately to bid good-bye to Mr. Hiram Donkin, late Deputy Minister of Mines, and also to meet Mr. Thos. J. Brown, who succeeds him as deputy head of the Mines Department. Mr. Donkin was kindly remembered by the Inspectors, who presented him with a nice set of pipes and a tobacco pouch.

Mr. Brown, in meeting the Inspectors for the first time, gave a short talk on coal mining. Referring to the duties of Mine Inspectors, he pointed out the great responsibility they carried, and the necessity of being fully alive to the causes of all mine accidents. "Disguise it as we may," said Mr. Brown, "the most prolific cause of mine explosion lies in having the air too far back from the working faces of the mine. This fact is well known to mining men everywhere, and we should see to it that all leading places and room faces are well ventilated. If these are kept



well mixed, the gas from veins newly cut and the dust made in tapping will be carried into return air ways and pass from these to the surface. If these precautions are neglected then we will not be able to prevent disasters in Nova Scotia, because we have not given attention to the prime principle of mining." Other phases of mining were touched on but the emphasis was laid on gas and coal dust. The inspectors returned to their several districts with the impression that Mr. Brown thoroughly understands the problems of mining, and intends that the Mines Department should carry its full share of responsibility in caring both for property and for the life and health of the miner.

**STEEL STRIKE OVER.**—Through the efforts of the OILERS' Committee the Sydney Steel workers returned to work on Monday after a five days' strike. Finding that the sentiment of the workers in general was strongly against a strike on behalf of McNeil, the discharged employee, though stampeded into leaving their jobs, and seeing that the men had no way of getting back honorably, the Steel officials made an offer to investigate the case after the men had returned to work. The men by an overwhelming vote accepted the offer and now all are at work. Few strikes have had less justification than this one, and it may be a long time before the men, many of them ordinarily level-headed, will permit themselves to be caught on the spur of the moment, interfering in any way with the discipline of the steel works.

Well-organized labor will not stand for any misconduct on the part of its members which, if countenanced, would undermine its own foundations. The strike is well over and with the heat of months of

agitation worked off, Sydney steel workers may have profited greatly by the reaction that comes from looking back at foolish and rash action.

### CANADIAN ASBESTOS IN GERMANY

The Canadian trade commissioner in Germany reports in the *Commercial Intelligence Journal* of February 17th, that during the first nine months of 1922 there was imported through the port of Hamburg 183,866 bags of asbestos, bags for Canada averaging 100 pounds each, and from Africa, 150 pounds. The total amount is approximately 11,500 tons. Most of this came from Canada, the Rhodesian and Australian varieties imported being brittle and of inferior grade.

During this period there was a notable revival of the supply of Russian asbestos, mostly short stock for shingles. There is evidence to show that these shipments are from stocks accumulated during the war time, and that little asbestos is being produced in Russia today. Prior to 1914 Russia provided the principal competition for Canadian asbestos in the German market.

A research conducted at the Technical High School in Munich, Germany, has disclosed the fact that the discoloration of lithopone-white pigments is due solely to the presence of the heavy metals (lead, antimony, etc.) as impurities. Lithopone made from pure barium and zinc compounds is absolutely unaffected by light.

It is not yet generally realized among domestic users that bituminous coal, which is objectionable on account of the smoke and gas evolved, can be converted into an ideal fuel, coke, in by-product coke-ovens.

## INDEX TO MINE AND MILL SUPPLIES

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**Assayers and Chemists:**  
Ledoux & Co.  
Thos. Heyes & Son.

**Assayer's and Chemists' Supplies:**  
Lymans, Limited.  
Mine & Smelter Supply Co.

### Balls:

Hebert, Alfred, Limited  
Holman Bros., Ltd.  
Hull Iron & Steel Foundries, Ltd.  
Peacock Brothers, Limited.  
The William Kennedy & Sons, Ltd.

### Ball Mills:

Herbert, Alfred, Limited.  
Holman Bros., Ltd.  
Hull Iron & Steel Foundries, Ltd.  
Mine & Smelter Supply.

### Ball Mill Feeders:

Herbert, Alfred, Limited.  
Holman Bros., Ltd.  
Hull Iron & Smelter Supply.  
Mine & Smelter Supply.

### Ball Mill Linings:

Canadian Steel Foundries, Ltd.  
The William Kennedy & Sons, Ltd.  
Peacock Bros., Ltd.  
Hull Iron & Steel Foundries, Ltd.  
Mine & Smelter Supply.

**Balances — Assay & Analytical:**  
Mine & Smelter Supply.

**Belting — Leather, Rubber & Cotton:**  
Canadian Link-Belt Co., Ltd.  
Jones & Glassco (Regd.).

**Belting:**  
Gutta Percha & Rubber, Ltd.

### Belting — Silent Chain:

Canadian Link-Belt Co., Ltd.  
Hans Renold of Canada, Ltd.,  
Jones & Glassco (Regd.).  
**Belting (Conveyor):**  
Gutta Percha & Rubber, Ltd.  
Dunlop Tire & Rubber Co., Ltd.

### Bins & Hoppers:

Can. Chicago Bridge & Iron Co., Ltd.  
Horton Steel Works, Ltd.  
The William Kennedy & Sons, Ltd.

### Bluestone:

The Consol'd Mining & Smelting Co.

### Boilers:

The William Kennedy & Sons, Ltd.

### Boxes, Cable Junction:

Standard Underground Cable Co. of  
Canada, Ltd.

### Buggies, Mine Car (Steel):

Hendrick Manufacturing Co.  
Herbert, Alfred, Limited.  
Holman Bros., Ltd.

### Brazilian Ballas:

Diamond Drill Carbon Co.

### Brick:

Wettlaufer Bros.

**Bronze, Manganese, Perforated & Plain:**  
Hendrick Manufacturing Co.

### Buckets:

Canadian Ingersoll-Rand Co., Ltd.  
Canadian Link-Belt Co. Ltd.  
Hadfields, Limited.  
Hendrick Manufacturing Co.  
Herbert, Alfred, Limited.  
Holman Bros., Ltd.  
The William Kennedy & Sons, Ltd.  
Peacock Bros., Ltd.

### Bucket Lips:

Canadian Steel Foundries, Ltd.  
The William Kennedy & Sons, Ltd.

### Cable — Aerial and Underground:

Canada Wire & Cable Co.  
Standard Underground Cable Co. of  
Canada Ltd.

Peacock Brothers, Limited.



**Dredging Ropes:**

Allan Whyte & Co.  
Greening, B., Wire Co., Ltd.

**Drills, Air and Hammer:**

Canadian Ingersoll-Rand Co., Ltd.  
Canadian Rock Drill Co.  
Denver Rock Drill Mfg. Co., Ltd.  
Herbert, Alfred, Limited  
Holman Bros., Ltd.  
Sullivan Machinery Co.  
The Mine & Smelter Supply Co.

**Drills—Core:**

Canadian Ingersoll-Rand Co., Ltd.  
Herbert, Alfred, Limited  
Holman Bros., Ltd.  
Sullivan Machinery Co.

**Drill Steel Furnaces:**

Canadian Ingersoll-Rand Co., Ltd.  
Denver Rock Drill Mfg. Co.  
Herbert, Alfred, Limited  
Holman Bros., Ltd.  
Sullivan Machinery Co.

**Drills—Diamond:**

Sullivan Machinery Co.

**Drill Steel—Mining:**

Canadian Ingersoll-Rand Co., Ltd.  
Hadfields, Limited  
Mussens, Limited

**Drill Steel Sharpeners:**

Canadian Ingersoll-Rand Co., Ltd.

**Electric Condensers:**

Griswold & Co.  
Canadian Rock Drill Co.  
Denver Rock Drill Mfg. Co., Ltd.  
Herbert, Alfred, Limited  
Holman Bros., Ltd.  
Northern Canada Supply Co.

**Drills—Electric:**

Herbert, Alfred, Limited  
Holman Bros., Ltd.  
Sullivan Machinery Co.  
Northern Electric Co., Ltd.

**Drills—High Speed and Carbon:**

Hadfields, Limited  
Herbert, Alfred, Limited  
Holman Bros., Ltd.

**Ejectors:**

Canadian Ingersoll-Rand Co., Ltd.

**Electric Hoists:**

Canadian Mead-Morrison Co.

**Elevators:**

Canadian Link-Belt Co., Ltd.  
Sullivan Machinery Co.  
Northern Canada Supply Co.  
Hadfields, Limited  
Jones & Glassco (Regd.).

**Engineering Instruments:**

Laurie & Lamb.  
C. L. Berger & Sons.

**Oil Engines:**

Canadian Ingersoll-Rand Co., Ltd.

**Engines:**

Canadian Sirrocco Co., Ltd.

**Engines—Gas and Gasoline:**

Sullivan Machinery Co.  
Gould, Shapely & Muir Co., Ltd.  
Laurie & Lamb.  
The Mine & Smelter Supply Co.

**Engines—Haulage:**

Canadian Ingersoll-Rand Co., Ltd.

**Engines—Steam:**

Canadian Ingersoll-Rand Co., Ltd.  
Laurie & Lamb.

**Engineers:**

Coyne, Alfred F. A.  
Dresser, John A.  
Door Co.  
Ferrier, W. F.  
Hore, R. E.  
Heves & Sons, Thos.  
Hersey Co., Ltd. Milton  
McEvoy, James C.  
Rogers, George R.  
Ross, Jas. G.  
Stewart, Robert H.  
Tyrrell, J. B.  
Whitman, Alfred B.  
Wilson, Ridgway R.

**Exhauster:**

Canadian Sirrocco Co., Ltd.

**Ferro-Alloys (all Classes):**

Canadian Steel Foundries, Ltd.  
Canadian Steel Foundries, Ltd.  
Everitt & Co.

**Fire Fighting Supplies:**

Gutta Percha & Rubber, Ltd.

**Flood Lamps:**

Northern Electric Co., Ltd.

**Flotation Oil:**

Hercules Powder Co.

**Flourspar:**

Consolidated Mining & Smelting Co.  
Everitt & Co.

**Forging:**

Canada Foundry & Forging, Ltd.

Herbert, Alfred, Limited  
Holman Bros., Ltd.  
Hull Iron & Steel Foundries, Ltd.  
Smart-Turner Machine Co.

**Coal Screening Plants:**

Canadian Link-Belt Co., Ltd.  
Canadian Mead-Morrison Co.

**Cobalt Oxide:**

Everitt & Co.

**Compressors—Air:**

Belliss & Morcom, Ltd.  
Canadian Ingersoll-Rand Co., Ltd.  
Denver Rock Drill Mfg. Co.  
Herbert, Alfred, Limited  
Holman Bros., Ltd.  
Laurie & Lamb.  
Smart-Turner Machine Co.  
Peacock, Brothers, Limited.

**Concrete Mixers:**

Gould, Shapely & Muir Co., Ltd.

**Condensers:**

Canadian Ingersoll-Rand Co., Ltd.  
Smart-Turner Machine Co.  
Belliss & Morcom, Ltd.  
Laurie & Lamb.  
Peacock Brothers, Ltd.

**Concentrating Tables:**

Herbert, Alfred, Limited  
Holman Bros., Ltd.  
The Mine & Smelter Supply Co.

**Condensers—Electrical Static & Power:**

Griswold & Co.

**Consultants and Engineers:**

Milton Hersey Co., Ltd.

**Conveyors:**

Canadian Link-Belt Co., Ltd.  
Canadian Mead-Morrison Co.  
Jones & Glassco (Regd.).

**Conveyor Belts:**

Gutta Percha and Rubber, Ltd.

**Conveyor Flights:**

Canadian Link-Belt Co., Ltd.

**Conveyor—Trough—Belt:**

Canadian Link-Belt Co., Ltd.  
Hendrick Mfg. Co.  
Jones & Glassco, Regd.

**Copper:**

Consolidated Mining & Smelting Co.

**Couplings:**

Hans Renold of Can., Ltd.

**Cranes:**

Canadian Link-Belt Co., Ltd.  
Canadian Mead-Morrison Co.  
Peacock Brothers, Limited  
Smart-Turner Machine Co.

**Crane Ropes:**

Allan Whyte & Co.  
Canada Wire & Cable Co.  
Greening, B., Wire Co., Ltd.

**Crucibles:**

The Mine & Smelter Supply Co.

**Crusher Balls:**

Canada Foundries & Forgings, Ltd.  
Herbert, Alfred, Limited  
Holman Bros., Ltd.  
Hull Iron & Steel Foundries, Ltd.  
Peacock Brothers, Limited.  
The William Kennedy & Sons, Ltd.

**Crushers:**

Canadian Ingersoll-Rand Co., Ltd.  
Herbert, Alfred, Limited  
Holman Bros., Ltd.  
Hull Iron & Steel Foundries, Ltd.  
Wettlaufer Bros.  
Lymans, Limited  
The Mine & Smelter Supply Co.  
Hadfields, Limited

**Cut Gears:**

Hans Renold of Can., Ltd.  
Jones & Glassco, Regd.  
The William Kennedy & Sons, Ltd.

**Cyanide:****Cyanide Plant Equipment:**

The Door Co.  
The Mine & Smelter Supply Co.

**Derricks:**

Smart-Turner Machine Co.

**Diamond Drill Contractors:**

Smith & Travers  
Sullivan Machinery Co.

**Digesters:**

Can Chicago Bridge & Iron Co., Ltd.  
Horton Steel Works, Ltd.

**Diesel Engines:**

Belliss & Morcom, Ltd.  
Laurie & Lamb.

**Dies:**

Canada Foundries & Forgings, Ltd.  
Herbert, Alfred, Limited  
Hull Iron & Steel Foundries, Ltd.  
Holman Bros., Ltd.

**Drain Tile:**

Wettlaufer Brothers.

**Dredges:**

Canadian Mead-Morrison Co.

**Dredger Pins:**

Hull Iron & Steel Foundries, Ltd.

**Dredging Machinery:**

Hadfields, Limited  
Hull Iron & Steel Foundries Ltd.

**Cages:**

Canadian Ingersoll-Rand Co., Ltd.  
The Mine & Smelter Supply Co.  
Herbert, Alfred, Limited.  
Holman, Ltd.  
The William Kennedy & Sons, Ltd.

**Cables—Wire:**

Standard Underground Cable Co., Ltd.  
Canada Wire & Cable Co.

**Cable Railway Systems:**

Canada Wire & Cable Co.

**Cam Shafts:**

Canada Foundries & Forgings, Ltd.  
Hebert, Alfred, Limited  
Holman Bros., Ltd.  
Hull Iron & Steel Foundries, Ltd.  
Peacock Brothers, Ltd.  
The William Kennedy & Sons, Ltd.

**Car Dumps:**

Canadian Mead-Morrison Co.  
Herbert, Alfred, Limited.  
Holman Bros., Ltd.  
Sullivan Machinery Co.

**Cars:**

Canadian Mead-Morrison Co.  
Herbert, Alfred, Limited.  
Holman Bros., Ltd.  
John J. Garthshore.  
Peacock Brothers, Limited.  
The William Kennedy & Sons, Ltd.

**Car Pullers:**

Canadian Mead-Morrison Co.

**Car Wheels and Axles:**

Herbert, Alfred, Limited.  
Holman Bros., Ltd.  
Hull Iron & Steel Foundries, Ltd.  
John J. Garthshore.  
Peacock Brothers, Limited  
The William Kennedy & Sons, Ltd.

**Carriers (Gravity):**

Jones & Glassco, Reg.

**Cast Steel Gears:**

Canada Foundries, Ltd.  
The William Kennedy & Sons, Ltd.

**Castings (Iron and Steel):**

Herbert, Alfred, Limited.  
Holman Bros., Ltd.  
Hull Iron & Steel Foundries, Ltd.  
Peacock Brothers, Limited.  
The William Kennedy & Sons, Ltd.

**Cement Machinery:**

Hadfields, Limited.  
Hull Iron & Steel Foundries, Ltd.  
The William Kennedy & Sons, Ltd.

**Chains:**

Jones & Glassco, Reg.  
Canadian Link-Belt Co., Ltd.  
Greening, B., Wire Co., Ltd.

**Chain Drives:**

Jones & Glassco (Regd.)

**Chain Drives—Silent and Steel Roller:**

Canadian Link-Belt Co., Ltd.  
Hans Renold of Can., Ltd.  
Jones & Glassco (Regd.).

**Chemist:**

Thos. Heyes & Sons.  
Milton Hersey Co.  
Ledoux & Co.

**Chrome Ore:**

Everitt & Co.

**Crusher Jaws:**

Canadian Steel Foundries, Ltd.  
The William Kennedy & Sons, Ltd.

**Crushing Rolls:**

Canadian Steel Foundries, Ltd.  
The William Kennedy & Sons, Ltd.

**Classifiers:**

The Dorr Company

**Clutches:**

Canadian Link-Belt Co., Ltd.  
Hans Renold of Can., Ltd.

**Coal:**

Dominion Coal Co.  
Nova Scotia Steel & Coal Co.

**Coal Cutters:**

Sullivan Machinery Co.  
Canadian Ingersoll-Rand Co., Ltd.  
Hebert, Alfred, Limited  
Holman Bros., Ltd.  
Peacock Brothers, Limited

**Coal Crushers:**

Canadian Link-Belt Co., Ltd.  
Peacock Brothers, Limited.

**Coal Mining Machinery:**

Canadian Ingersoll-Rand Co., Ltd.  
Canadian Rock Drill Co.  
Denver Rock Drill Lfg. Co., Ltd.  
Sullivan Machinery Co.  
Hadfields, Limited.  
Hendrick Mfg. Co.  
Hebert, Alfred, Limited  
Holman Bros., Ltd.



**Pipes:**

Consolidated Mining & Smelting Co.  
Coal and Coke Handling Machinery  
Canadian Link-Belt Co., Ltd.

**Coal Pick Machines:**

Canadian Ingersoll-Rand Co., Ltd.  
Herbert, Alfred, Limited.  
Holman Bros., Ltd.  
Sullivan Machinery Co.

**Forges:**

Canadian Steel Foundries, Ltd.  
Hull Iron & Steel Foundries.  
John J. Gartshore.

**Furnaces—Assay:**

Lynch, Limited.  
Mine & Smelter Supply Co.

**Gasoline Engines:**

Bellman & Morcom, Ltd.  
Laurie & Lamb.

**Gasoline Extraction Compressors:**

Canadian Ingersoll-Rand Co., Ltd.  
Sullivan Machinery Co.

**Gasoline Tanks:**

Can. Chicago Bridge & Iron Co., Ltd.  
Horton Steel Works, Ltd.

**Gaskets:**

Gutta Percha & Rubber, Ltd.

**Gears:**

Hans Renold of Canada, Ltd.  
Jones & Glasco, Regd.  
The William Kennedy & Sons, Ltd.

**Gears (Cast):**

Canadian Link-Belt Co., Ltd.  
Hull Iron & Steel Foundries, Ltd.  
The William Kennedy & Sons, Ltd.

**Gears, Machine Cut:**

The Hamilton Gear & Machine Co.  
The William Kennedy & Sons, Ltd.

**Gold Refiners:**

Goldsmith Bros.

**Gold Trays:**

Can. Chl. Bridge & Iron Works, Ltd.  
Horton Steel Works, Ltd.

**Grab-Buckets:**

Canadian Mead-Morrison Co.

**Hand Cars:**

Sylvester Mfg. Co., Ltd.

**Hose:**

Goodyear Tire & Rubber Co.  
Gutta Percha & Rubber, Ltd.  
Dunlop Tire & Rubber Co.

**Hammer Rock Drills:**

Canadian Ingersoll-Rand Co., Ltd.  
Canadian Rock Drill Co.  
Denver Rock Drill Mfg. Co., Ltd.  
Herbert, Alfred, Ltd.  
Sullivan Machinery Co.

**Hangers and Cables:**

Stan. Underground Cable Co., Ltd.

**Heating Systems:**

Canadian Sirocco Co., Ltd.

**High Speed Steel:**

Hadfields, Ltd.

**Hoists—Air, Electric and Steam:**

Canadian Ingersoll-Rand Co., Ltd.  
Canadian Rock Drill Co.  
Denver Rock Drill Mfg. Co., Ltd.  
Herbert, Alfred, Ltd.  
Holman Bros., Ltd.  
Jones & Glasco, Regd.  
Mine & Smelter Supply Co.  
Canadian Link-Belt Co., Ltd.  
Peacock Bros., Ltd.  
Sullivan Machinery Co.

**Hoisting Towers:**

Canadian Mead-Morrison Co.

**Hose:**

Gutta Percha & Rubber, Ltd.

**Hydraulic Machinery:**

Hadfields, Ltd.  
Jones & Morcom, Ltd.  
Laurie & Lamb.  
The William Kennedy & Sons, Ltd.

**Oil Storage Tanks:**

Can. Chicago Bridge & Iron Co., Ltd.  
Horton Steel Works, Ltd.  
The Toronto Iron Works, Ltd.

**Industrial Chemists:**

Hersey, M. & Co., Ltd.

**Insulating Compounds:**

Stan. Underground Cable Co.

**Inspectors:**

Hersey, M. & Co., Ltd.

**Jacks:**

Northern Canada Supply Co.

**Jaw & Gyratory Crushers:**

Engineering & Equipment.  
Herbert, Alfred, Limited.  
Holman Bros., Ltd.

**Lamp-Miners:**

Northern Electric Co.  
Peacock Bros., Ltd.

**Lead (Pig):**

Consolidated Mining & Smelting Co.

**Levels:**

C. L. Berger & Sons.

**Light & Heavy Steel Plate Construction:**

Hendrick Mfg. Co.  
The William Kennedy & Sons, Ltd.

**Locomotives (Steam, Compressed Air and Storage):**

Canadian Ingersoll-Rand Co., Ltd.  
Laurie & Lamb.

**Link Belt:**

Canadian Link-Belt Co., Ltd.  
Northern Canada Supply Co.  
Jones & Glasco, Regd.

**Machine Guards:**

Greening, B. Wire Co., Ltd.

**Magnesium Metal:**

Everitt & Co.  
Hull Iron & Steel Foundries, Ltd.

**Manganese Steel:**

Hadfields, Ltd.  
Hull Iron & Steel Foundries, Ltd.

**Manganese-Steel Trackworks:**

Canadian Steel Foundries, Ltd.

**Metal Merchants:**

Consolidated Mining & Smelting Co.  
C. L. Constant Co.  
Everitt & Co.

**Metallurgical Engineers:**

The Dorr Co.

**Metallurgical Machinery:**

Dwight & Lloyd Sintering Co.  
The Dorr Co.  
The Mine & Smelter Supply Co.

**Metal Work, Heavy Plates:**

Can. Chicago Bridge & Iron Co., Ltd.  
Horton Steel Works, Ltd.  
The William Kennedy & Sons, Ltd.

**Mica:**

Everitt & Co.

**Mine Cars:**

Canadian Steel Foundries, Ltd.  
The William Kennedy & Sons, Ltd.

**Mining Engineers:**

Hersey, M. & Co., Ltd.

**Mining Drill Steel:**

Hadfields, Limited.

**Mining Requisites:**

Dominion Wire Rope Co., Ltd.  
Hadfields, Limited.  
Hull Iron & Steel Foundries, Ltd.

**Mining Ropes:**

Dominion Wire Rope Co., Ltd.  
Peacock Brothers, Ltd.

**Mine Surveying Instruments:**

C. L. Berger & Sons.

**Molybdenite:**

Everitt & Co.

**Motors:**

Peacock Brothers, Ltd.

**Nickel:**

The Mond Nickel Co., Ltd.

**Ore Handling Equipment:**

Canadian Link-Belt Co., Ltd.  
Canadian Mead-Morrison Co.  
Herbert, Alfred, Limited.

**Ore Sacks:**

Northern Canada Supply Co.

**Ore Testing Works:**

Ledoux & Co.  
Can. Laboratories.  
Hoyt Metal Co.

**Ores & Metals—Buyers & Sellers of:**

Geo. G. Blackwell.  
Consolidated Mining & Smelting Co.  
Everitt & Co.

**Oils:**

Hercules Powder Co.

**Pavers:**

Wettlaufers Brothers.  
Gutta Percha & Rubber, Ltd.  
Laurie & Lamb.

**Perforated Metals:**

Hendrick Mfg. Co.  
Canada Wire & Iron Goods Co.  
Greening, B. Wire Co.

**Pillow Blocks:**

Canadian Link-Belt Co., Ltd.  
The William Kennedy & Sons, Ltd.

**Pipe — Wood Stave:**

Pacific Coast Pipe Co.  
Mine & Smelter Supply Co.  
Canadian Ingersoll-Rand Co., Ltd.

**Piston Rock Drills:**

Mine & Smelter Supply Co.  
Herbert, Alfred, Limited.  
Holman Bros., Ltd.

**Plate Works:**

Can. Chl. Bridge & Iron Co., Ltd.  
Hendrick Mfg. Co.  
The William Kennedy & Sons, Ltd.  
Horton Steel Works, Ltd.

**Platinum Refiners:**

Goldsmith Brothers.

**Pneumatic Tools:**

Canadian Ingersoll-Rand Co., Ltd.  
Herbert, Alfred, Limited.  
Holman Bros., Ltd.

**Portable Column Hoists:**

Canadian Ingersoll-Rand Co., Ltd.  
Denver Rock Drill Mfg. Co.  
Herbert, Alfred, Limited.  
Holman Bros., Ltd.  
Sullivan Machinery Co.

**Power Factor Correcting Devices:**

Griswold & Co.

**Power Condensers:**

Griswold & Co.

**Prospecting Mills & Machinery:**

Mine & Smelter Supply Co.

**Pumps—Pneumatic:**

Canadian Ingersoll-Rand Co., Ltd.  
Smart-Turner Machine Co.  
Sullivan Machinery Co.

**Pumps—Steam:**

Canadian Ingersoll-Rand Co., Ltd.  
Northern Canada Supply Co.  
Peacock Brothers, Ltd.  
Smart-Turner Machine Co.

**Pumps-Turbines:**

Smart-Turner Machine Co.  
Canadian Ingersoll-Rand Co., Ltd.  
Laurie & Lamb.  
Peacock Brothers, Ltd.

**Pumps-Vacuum:**

Canadian Ingersoll-Rand Co., Ltd.  
Smart-Turner Machine Co.  
Peacock Brothers, Ltd.

**Pumps—Valves:**

Peacock Brothers, Ltd.

**Pulleys Shafting and Hangers:**

The William Kennedy & Sons, Ltd.

**Pulverizers—Laboratory:**

Herbert, Alfred, Limited.  
Holman Bros., Ltd.  
Mine & Smelter Supply Co.

**Pumps—Boiler Feed:**

Canadian Ingersoll-Rand Co., Ltd.  
Smart-Turner Machine Co.  
Peacock Brothers, Ltd.

**Pumps—Centrifugal:**

Canadian Ingersoll-Rand Co., Ltd.  
Laurie & Lamb.  
Peacock Brothers, Limited.  
Smart-Turner Machine Co.

**Pumps—Diaphragm:**

The Dorr Company.  
The William Kennedy & Sons, Ltd.

**Pumps—Electric:**

Canadian Ingersoll-Rand Co., Ltd.  
Laurie & Lamb.

Peacock Brothers, Ltd.

Smart-Turner Machine Co.

**Pumps—Sand & Slime:**

Canadian Ingersoll-Rand Co., Ltd.  
Laurie & Lamb.  
Mine & Smelter Supply Co.  
Peacock Brothers, Ltd.  
Smart-Turner Machine Co.  
Sylvester Mfg. Co., Ltd.

**Push Cars:**

Sylvester Mfg. Co.

**Poultry Netting:**

Greening, B. Wire Co., Ltd.

**Quarrying Machinery:**

Canadian Ingersoll-Rand Co., Ltd.  
Canadian Rock Drill Co.  
Denver Rock Drill Mfg. Co., Ltd.  
Hadfields, Limited.  
Herbert, Alfred, Limited.  
Holman Bros., Ltd.  
Sullivan Machinery Co.

- Rails:**  
Hadfields, Limited.  
John J. Gartshore.
- Refiners:**  
Goldsmith Brothers.
- Riddles:**  
Hendrick Mfg. Co.
- Roll Mills:**  
Mine & Smelter Supply Co.
- Roll Shells:**  
The William Kennedy & Sons, Ltd.  
Canadian Steel Foundries, Ltd.
- Roller Chain:**  
Hans Renold of Canada, Ltd.  
Canadian Link-Belt Co., Ltd.  
Jones & Glassco, Regd.
- Rope—Manilla & Jute:**  
Jones & Glassco, Regd.  
Allan, Whyte & Co.
- Rope—Wire:**  
Anglo Canadian Wire Rope Co.  
Allan, Whyte & Co., Ltd.  
Canada Wire & Cable Co.  
Canada Wire & Iron Goods Co.  
Dominion Wire Rope Co., Ltd.  
Greening, B. Wire Co.
- Rolls—Crushing:**  
Canadian Ingersoll-Rand Co., Ltd.  
Everitt & Co.  
Hadfields, Limited.  
Hull Iron & Steel Foundries, Ltd.  
Herbert, Alfred, Ltd.  
Holman Bros., Ltd.  
Wettlaufer Bros.
- Samplers:**  
Canada Metal Co.  
Ledoux & Co.  
Milton Hersey Co.  
Thos. Heyes & Son.  
Mine & Smelter Supply Co.
- Screens:**  
Canadian Ingersoll-Rand Co., Ltd.  
Greening, B. Wire Co.  
Hendrick Mfg. Co.  
Canada Wire & Iron Goods Co.
- Screens—Cross Patent Flanged Lip:**  
Hendrick Mfg. Co.
- Screens—Perforated Metal:**  
Hendrick Mfg. Co.
- Screens—Shaking:**  
Canadian Link-Belt Co., Ltd.  
Hendrick Mfg. Co.
- Screens—Revolving:**  
Canadian Link-Belt Co., Ltd.  
Hendrick Mfg. Co.  
The William Kennedy & Sons, Ltd.
- Separators:**  
Smart-Turner Machine Co.  
Mine & Smelter Supply Co.
- Sewer Pipes:**  
Wettlaufer Bros.
- Shaft Contractors:**  
Hendrick Mfg. Co.
- Sheet Metal Work:**  
Hendrick Mfg. Co.
- Sheets—Genuine Manganese Bronze:**  
Hendrick Mfg. Co.
- Sheets and Dies:**  
Hull Iron & Steel Foundries, Ltd.  
Peacock Brothers, Ltd.  
The William Kennedy & Sons, Ltd.
- Ship Loaders:**  
Canadian Mead-Morrison Co.
- Silent Chain:**  
Canadian Link-Belt Co., Ltd.  
Hans Renold of Canada, Ltd.  
Jones & Glassco, Regd.
- Silent and Steel Roller:**  
Canadian Link-Belt Co., Ltd.  
Jones & Glassco, Regd.
- Saline Refiners:**  
Goldsmith Brothers.
- Smelters:**  
Goldsmith Bros.
- Sledges:**  
Canada Foundries & Forgings.
- Sintering:**  
Dwight & Lloyd Sintering Co., Inc.
- Smoke Stacks:**  
Can. Chicago Bridge & Iron Co., Ltd.  
Horton Steel Works, Ltd.  
Hendrick Mfg. Co.  
The William Kennedy & Sons, Ltd.
- Special Machinery:**  
The William Kennedy & Sons, Ltd.
- Spelter:**  
Consolidated Mining & Smelting Co.
- Sprockets:**  
Hans Renold of Canada, Ltd.
- Canada Link-Belt Co., Ltd.**  
Jones & Glassco, Regd.  
The William Kennedy & Sons, Ltd.
- Static Condensers:**  
Griswold & Co.
- Spring Coil & Clips Electric:**  
Canadian Steel Foundries, Ltd.
- Steel Barrels:**  
Smart-Turner Machine Co.
- Stamp Batteries:**  
Herbert, Alfred, Limited.  
Holman Bros., Ltd.
- Stamp Forgings:**  
Canada Foundries & Forgings, Ltd.  
Hull Iron & Steel Foundries.
- Steel Castings:**  
Canadian Steel Foundries, Ltd.  
Canadian Brakeshoe Co., Ltd.  
Hull Iron & Steel Foundries, Ltd.  
Hadfields, Ltd.  
The William Kennedy & Sons, Ltd.
- Steel Drills:**  
Canadian Rock Drill Co.  
Denver Rock Drill Mfg. Co., Ltd.  
Sullivan Machinery Co.  
Peacock Brothers, Ltd.  
Canadian Ingersoll-Rand Co., Ltd.
- Steam Hoisting Engines:**  
Canadian Mead-Morrison Co.
- Steam Engines:**  
Belliss & Morcom, Ltd.  
Laurie & Lamb.
- Steam Traps:**  
Canadian Sirocco Co., Ltd.  
Laurie & Lamb.
- Steel Drums:**  
Smart-Turner Machine Co.
- Steel-Tool:**  
N. S. Steel & Coal Co.  
Hadfields, Limited.
- Structural Steel Work—Light:**  
Hendrick Mfg. Co.  
The William Kennedy & Sons, Ltd.
- Stone Breakers:**  
Holman Brothers, Ltd.  
Canadian Ingersoll-Rand Co., Ltd.  
Denver Rock Drill Mfg. Co.  
Herbert, Alfred, Limited.
- Stone Quarrying Machinery:**  
Canadian Ingersoll-Rand Co., Ltd.  
Denver Rock Drill Mfg. Co.  
Sullivan Machinery Co.
- Sulphate of Copper:**  
The Mond Nickel Co., Ltd.
- Surveying Instruments:**  
C. L. Berger.
- Switches:**  
Canadian Steel Foundries, Ltd.
- Switches and Turntables:**  
John J. Gartshore.
- Tables—Concentrating:**  
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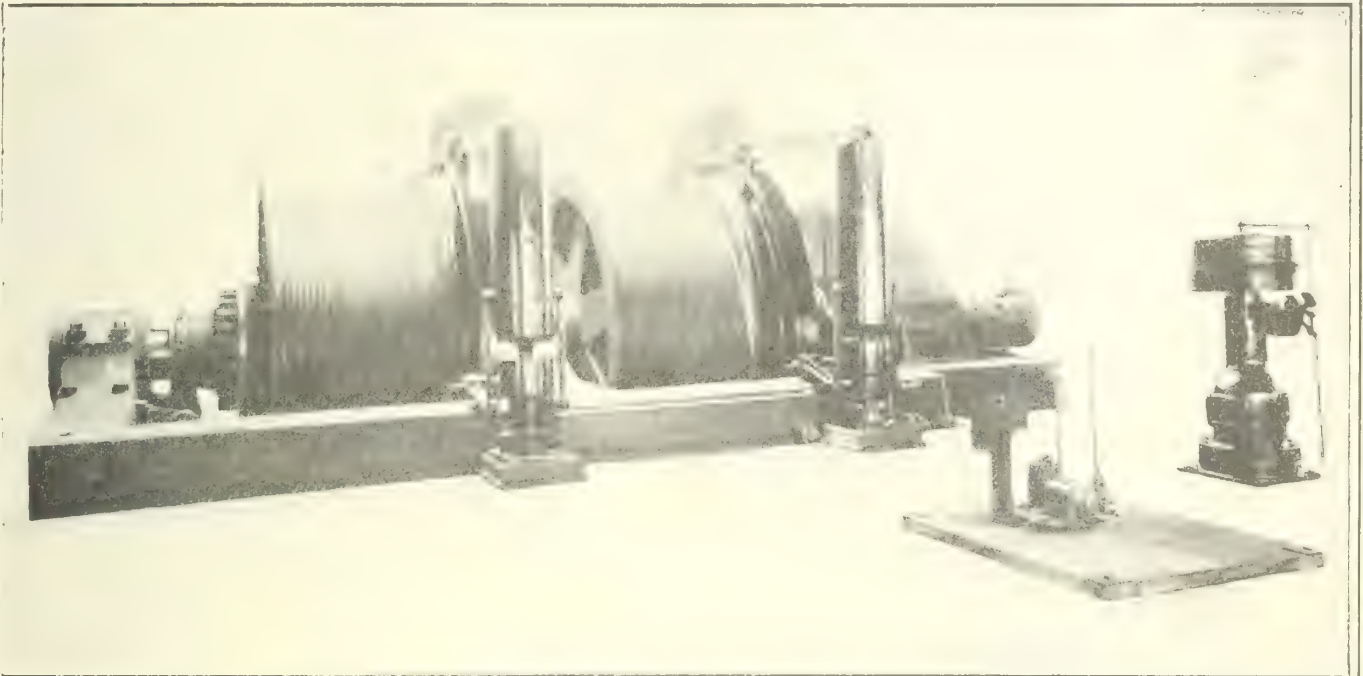
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# Ontario's



# Minerals

PROVINCE OF ONTARIO

DEPARTMENT OF MINES

HON H. MILLS, Minister of Mines

## Mineral Areas.

Ontario, with its 407,262 square miles, contains many millions of acres in which the geological formations are favorable for the occurrence of minerals, 70 per cent of the area being underlain by rocks of pre-Cambrian age. The phenomenally rich silver mines of Cobalt occur in these rocks; so also do the far-famed nickel-copper deposits of Sudbury, the gold of Porcupine and Kirkland Lake, and the iron ore of Magpie and Moose Mountain mines.

## Economic Minerals.

In addition to the above, practically all economic minerals (coal and tin excepted) are found in Ontario:—actinolite, apatite, arsenic, asbestos, cobalt, corundum, feldspar, fluor-spar, graphite, gypsum, iron pyrites, lead, mica, molybdenite, natural gas, palladium, petroleum, platinum, quartz, salt, talc and zinc. This Province has the largest deposits on the continent of talc, feldspar, mica and graphite.

Building materials, such as ornamental marble, limestone, sandstone, granite, trap, sand and gravel, lime, portland cement, brick and tile, meet every demand.

## Mineral Production.

Preliminary returns show the output of the mines and metallurgical works of the Province for the year 1921 to be worth \$48,128,387, of which the metallic production was \$27,574,202.

The following figures show the rapid growth of Ontario's mineral industry by five-year periods since 1891:

| Year.         | Value.      | Year.         | Value.       |
|---------------|-------------|---------------|--------------|
| 1891 .. . . . | \$4,705,672 | 1906 .. . . . | \$22,388,383 |
| 1896 .. . . . | 5,235,003   | 1911 .. . . . | 41,976,797   |
| 1901 .. . . . | 11,831,086  | 1916 .. . . . | 65,303,822   |

## Dividends.

Dividends and bonuses paid to the end of 1921 amounted to \$23,140,734 for gold mining companies, and \$84,388,185 for silver mining companies or a total of \$107,528,919.

## Mining Regulations.

A miner's license costs \$5.00 per annum, and entitles the holder to stake out in any or every mining division three claims of 40 acres each. After performing 200 days' assessment work on a claim, patent may be obtained from the Crown on payment of \$2.50 or \$3.00 per acre, depending on location in unsurveyed or surveyed territory.

## Assay Office.

The Provincial Assay Office at No. 5 Queen's Park, Toronto, is maintained by the Department of Mines for the free identification of minerals, free assays under the provisions of the Mining Act of Ontario, and also for general assay work as per the Schedule of Charges which may be obtained on application.

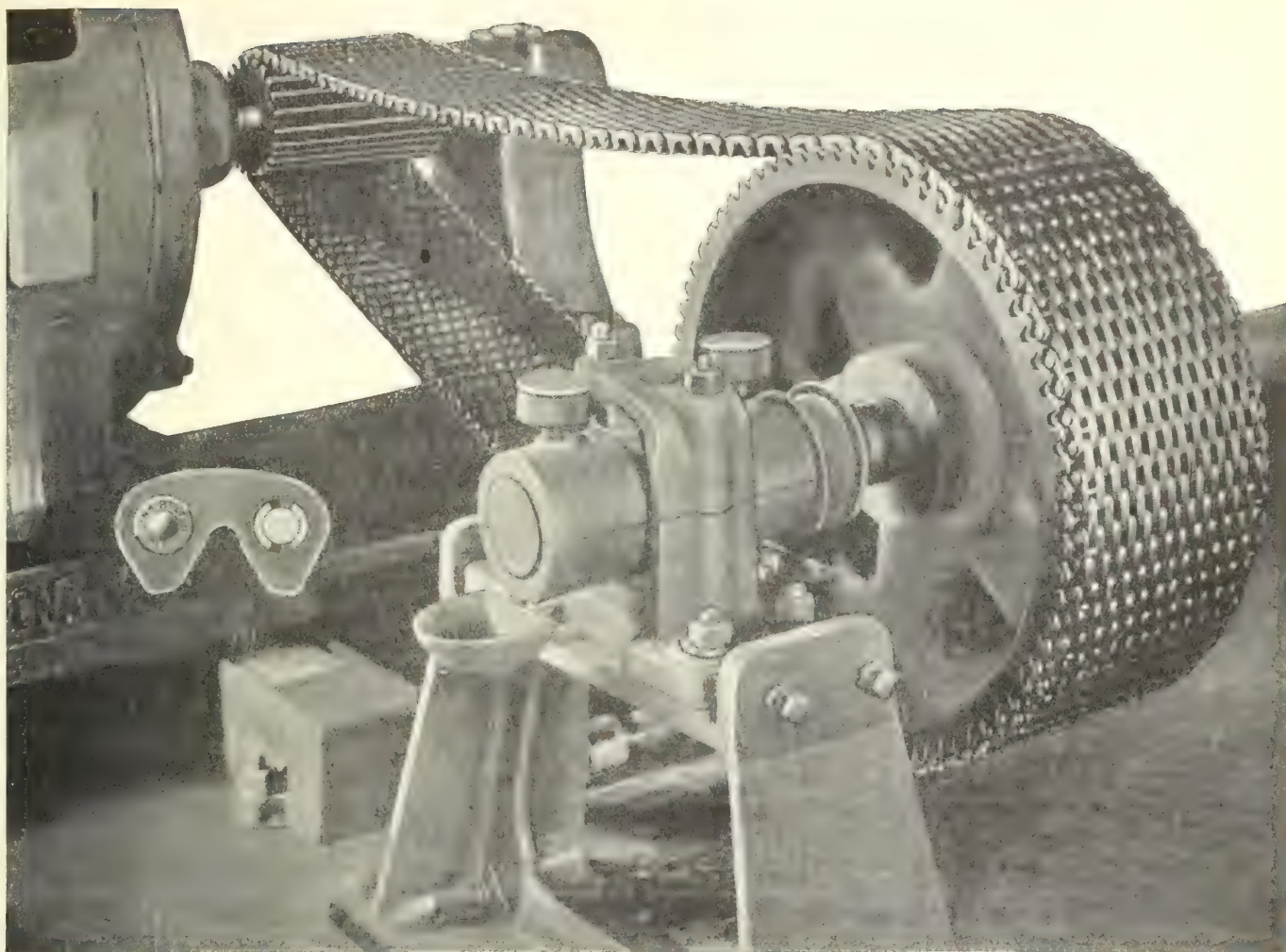
## Temiskaming Testing Laboratories

The Department maintains, at Cobalt, an ore sampling and testing laboratory which is now prepared to receive parcels of gold ore from 100 pounds upward, and after sampling and assaying the same to pay to the shipper the value thereof, less treatment charges. The purpose is to afford a market for ores extracted by prospectors and others in developing their mining claims, enabling them to obtain funds which they can use for further work and to report on the most satisfactory method of treatment. Fuller information may be obtained on application to the Manager, Temiskaming Testing Laboratories, Cobalt, Ontario.

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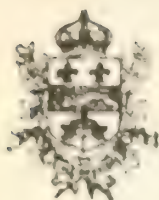
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**WORKING CONDITIONS.** During the first six months following the staking of the claim, work on it must be performed to the extent of at least twenty-five days of eight hours.

**SIX MONTHS AFTER STAKING.** At the expiration of six months from the date of the staking, the prospector, to retain his rights, must take out a mining license.

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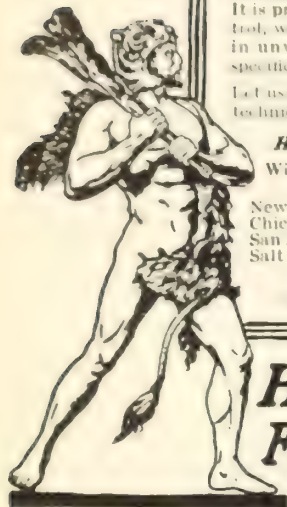
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### MINES BRANCH

#### Recent Publications

- Phosphate in Canada, by H. S. Spence.  
The Preparation, Transportation and Combustion of Powdered Coal, by John Blizard.
- Road Materials along the St. Lawrence River, from Quebec Boundary to Cardinal, Ont., by R. H. Picher.
- Building and Ornamental Stones of Canada (British Columbia.) Vol. V., by W. A. Parks, Ph. D.
- Barium and Strontium in Canada, by H. S. Spence.  
The Coalfields and Coal Industry of Eastern Canada, by F. W. Gray.
- The Value of Peat Fuel for the Generation of Steam, by J. Blizard, B. Sc.
- Analyses of Canadian Fuels. Parts I to V, by E. Stansfield M. Sc., and J. H. H. Nicolls, M. Sc.
- Graphite by H. S. Spence.
- Gas Producer Trials with Alberta Coals, by J. Blizard and E. S. Malloch.
- Summary Report of the Mines Branch, 1920.  
The Mines Branch maintains the following laboratories in which investigations are made with a view to assisting in the development of the general mining industry of Canada:—
- Fuel Testing Laboratory.**—Testing value of Canadian fuels for steam raising and production of power gas; analyses, and other chemical and physical examinations of solid, liquid and gaseous fuels are also made.
- Ore-Dressing Laboratory.**—Testing of Canadian ores and minerals, to ascertain most economical methods of treatment.
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- Ceramic Laboratory.**—Equipment is such that complete physical tests on clays and shales of the Dominion can be made, to determine their value from an economic standpoint.
- Structural Materials Laboratory.**—Experimental work on sands, cements and limes is also undertaken.
- Applications for reports and particulars** relative to having investigations made in the several laboratories should be addressed to **The Director, Mines Branch, Department of Mines, Ottawa.**
- Summary Report.** The annual Summary Report of the Geological Survey is now printed in parts. Applicants should, therefore, state what particular geologist report is required, or what subject they are interested in.
- Memoir 108. The Mackenzie River Basin, by Charles Camsell and Wyatt Malcolm.

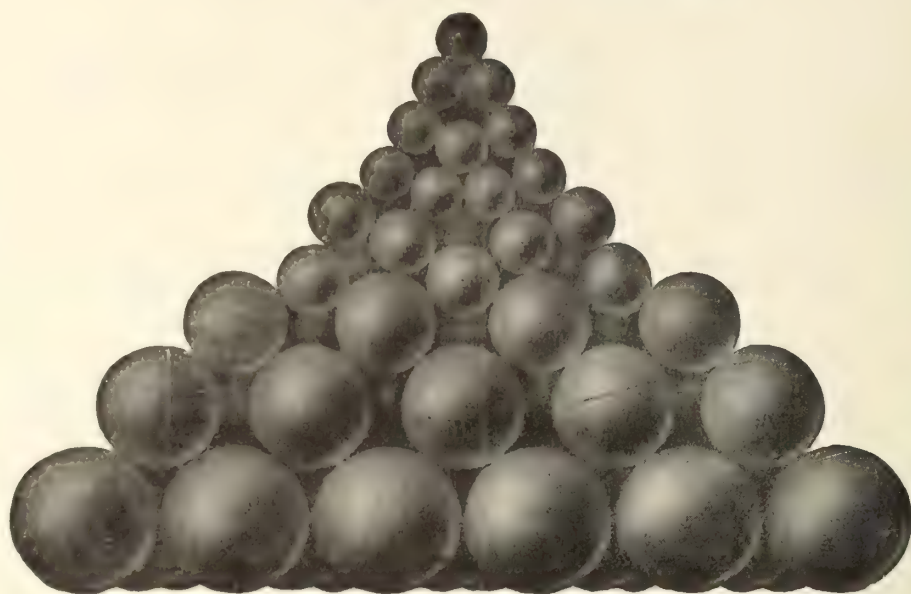
### GEOLOGICAL SURVEY

#### Recent Publications

- Memoir 119. The Reed-Wekusko Map-Area, Northern Manitoba, by F. J. Alcock.
- Memoir 121. The Malagash Salt Deposit, Cumberland County, N. S., by A. O. Hayes.
- Memoir 123. Sixtymile and Ladue Rivers Area, Yukon, by W. E. Cockfield.
- Memoir 125. Sedimentation of the Fraser River delta, by W. A. Johnston.
- Memoir 127. Beauceville map-area, Quebec, by B. R. McKay.
- Memoir 128. Winnipegosis and Upper Whitemouth River areas, Manitoba, Pleistocene and Recent deposits, by W. A. Johnston.
- Memoir 130. Geology and mineral deposits of the Bridge River map-area, British Columbia, by W. S. McCann.
- Memoir 131. Kenogami, Round and Larder Lake areas, Timiskaming district, Ontario, by H. C. Cooke.
- Map 1585. Mackenzie River basin, 1922 edition. Geology.
- Map 1751. Wainwright, Alberta. Topography.
- Map 1752. Monitor, Alberta and Saskatchewan. Topography.
- Map 1754. Upper Elk and Highwood rivers, British Columbia and Alberta. Topography.
- Map 1829. Salmon River area, Portland Canal mining division, B. C. Geology.
- Map 1831. Vegreville; townships 47 to 55, ranges 11 to 16 west of the 4th meridian, Alberta. Topography.
- Map 1835. Beauceville, Beauce county, Quebec. Geology.
- Map 1836. Explored routes in a belt traversed by the Canadian National Railways between Longlac and Nipigon, Ontario. Geology.
- Map 1860. Keno Hill area, Mayo district, Yukon. Geology.
- Map 1882. Bridge River, B. C. Geology.
- Map 1901. Upper Kitzault valley, B. C. Geology.
- Map 1948. Wanapitei Lake area, Ont. Geology.
- Applicants for publications not listed above should mention the precise area concerning which information desired.
- The Geological Survey will, under certain limitations, give information and advice upon subjects relating to general and economic geology. Mineral and rock specimens, when accompanied by definite statements of localities, will be examined and their nature reported upon.
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PUBLISHED WEEKLY

Devoted to the Science and Practice of Mining, Metallurgy and the Allied Industries; and more particularly to their progress in Canada

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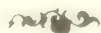
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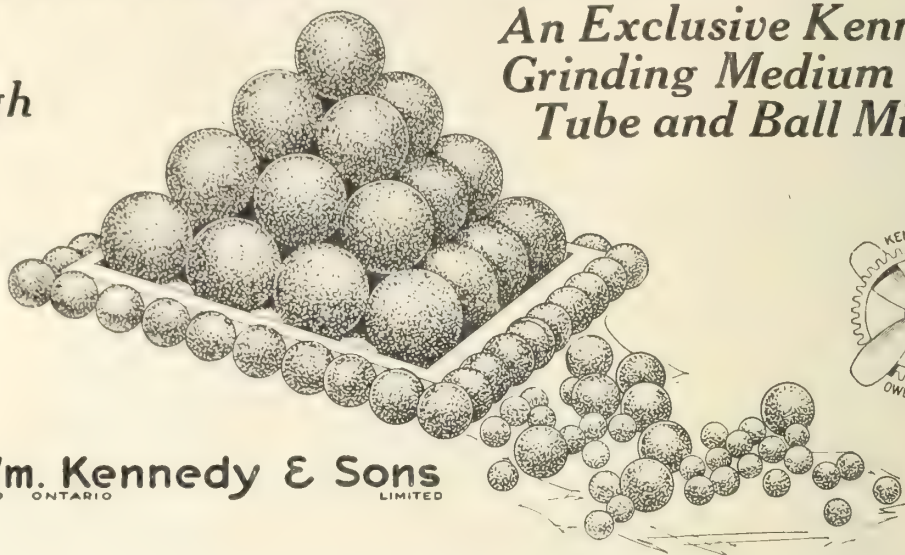


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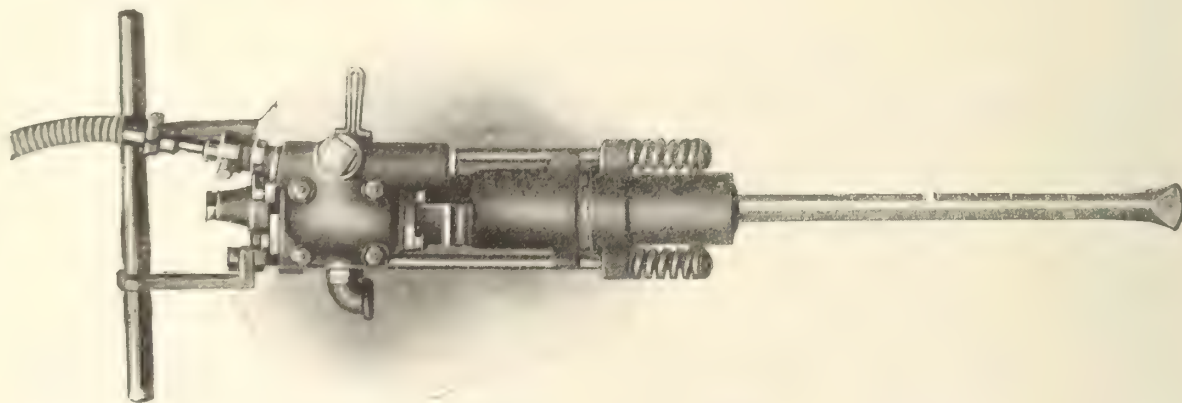
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## -:- EDITORIAL -:-

*It behooves us [the Canadian Mining Institute], as the body most likely to be affected, to do what we can to put the work, not only of ourselves but of the profession at large, on the highest possible plane. —J. B. Porter — 1897*

### PLAIN SPEECH

In Mr. T. A. Rickard's paper, "The Duties and Privileges of Technical Journalism," reprinted in the February number of the "Monthly Bulletin" of the Canadian Institute of Mining and Metallurgy, there is a startlingly clear statement of the case against "subsidized journalism." Mr. Rickard uses that phrase to describe publications of technical societies that strive to take the place of independently published technical periodicals.

There is nothing equivocal in Mr. Rickard's attack and indictment. "The independent technical press in Canada and the United States is entitled, so long as it performs its duties efficiently and honorably, to be immune from commercial competition on the part of publications issued by Mining Institutes in the two countries... A paper more than 60 years old has gone out of business partly in consequence of the invasion of its field by the subsidized journalism of a social organization; to be specific, the 'Mining and Scientific Press,' founded in 1860, ceased publication in 1922 because, among other reasons, the American Institution of Mining and Metallurgical Engineers has chosen to engage in publishing a monthly magazine meant to cover the same field. Again, the 'Canadian Mining Journal' has been reduced to a mere simulacrum of itself by reason of the commercial competition established successfully by the monthly magazine issued by the Canadian Institute... You — the mining profession — are killing independent technical journalism for the sake of substituting something entirely different; you are developing a subsidized technical press controlled by a coterie."

Perhaps no one but T. A. Rickard could have written so poignantly on the subject. Strong his language is, but his facts and his logic are equally strong. His conclusions are incontrovertible.

Let us, like Mr. Rickard, be frank. Twenty-odd years ago, the late B. T. A. Bell, the founder of the "Canadian Mining Journal" (which began existence as the "Canadian Mining Review") also organized the Canadian Mining Institute. His publication was the official organ of the Institute and made the Institute's existence possible. For years Bell nursed the Institute through perilous illnesses. Mr. H. Mortimer-

Lamb, who succeeded Mr. Bell as editor of the "Review," became secretary of the Institute. When the "Review," under changed ownership, became the "Canadian Mining Journal," Mr. Lamb was for some years a highly valued contributor to the "Journal's" pages and those pages were always freely at the disposal of the Institute. Gradually, however, the scope and size of the Institute's "Monthly Bulletin" were increased. Gradually, also, it absorbed more and more of the Secretary's time to the exclusion of other highly important duties. The "Bulletin", from being merely a reprint of the Institute papers, now became a serious competitor in the field that had been exclusively the "Journal's". Inevitably the "Journal" suffered. Whilst we hardly agree with Mr. Rickard's cheerful asseveration that it is now "a mere simulacrum" of its former self, it is true that the "Journal" has been grievously handicapped by the competition gratuitously offered by the "Bulletin". The "Journal" is not given to complainings; but it has felt itself wounded in the house of its friends.

The culminating point has now been reached. Last year the Institute very nearly bankrupted itself by spending more than half its income on publications. Enforced retrenchment now necessitates the elimination of those sections of the "Bulletin" that mostly made it a competitor of the "Journal."

Consider now these facts. In its effort to enter the field of commercial journalism, a field already amply filled, the Institute has come close to wrecking itself. It has also severely restricted the usefulness of the publication that has been, and is, the recognized organ of the mineral industries of Canada. These have been the net results of a costly and ill-advised experiment.

At this point Mr. Rickard may again be effectively quoted: "Permit me to make another suggestion — applicable also as between your Institute and the 'Canadian Mining Journal': As there is now only one technical mining paper in the United States, why should it not set aside two or four pages gratuitously in each issue for the use of the secretary of the Institute?... It appears to me to be one way out of an intolerable position, and a step advantageous to both parties."

"The Canadian Mining Journal" recognizes in this suggestion a solution of the "impasse" that has existed. Such an arrangement will become mutually



and increasingly beneficial as time proceeds. And it is our strong conviction that this is the most direct road for the Institute to take towards solvency and efficiency. A definite offer of co-operation on these lines has been made to the Council of the Institute, and rejected. If a future occasion should warrant it, the offer will be renewed.

There is much work for the Institute to do. This work cannot be well done unless attacked with single-ness of purpose and concentration of effort. It cannot be done at all if the Institute permits its energies to be dissipated in directions that are foreign to the national purposes for which it was founded.

### THE PROSPECTOR'S PROGRESS

The mining engineer in Canada is developing rapidly a regard for his fellow-worker, the prospector. It is well that this is so, for their interests are intimately connected; in fact they are inseparable. The prospector of today has earned the regard of the engineer by reason of the immense advance he has made during recent years in his methods of prospecting. Just at present he is struggling with some measure of success to fit himself better into the economic organization of the mining industry; that is he is learning to demand less cash from the man who will develop his raw prospect, and is trying hard to be satisfied with a further grubstake and a share in the mine-to-be.

How has the mining engineer charged with the responsibility of examining the prospector's find responded to the call for coöperation? Not so well as the prospector, we fear. There is still a prevalent tendency to expect a ready-made mine, a thing no prospector can provide. Fortunately here, again, a spirit of progress is in the air, and the reasonable attitude of a small number of examining engineers who have made an outstanding success of their work is educating the remainder to the necessity for active coöperation with the prospector. As has been pointed out frequently, sound advice and judicious encouragement will often stimulate the prospector to effort that will put his property "over the hump." Such assistance on the part of the engineer costs him nothing and is bound to be of benefit to himself as well as the prospector in the long run. A number of our geologists in the public employ do this service to the prospectors systematically, and although they do not benefit by a dollar's worth in the result, the occasional public acknowledgement of the practical benefit of their services must warm the cockles of their hearts.

The growing appreciation of the work of the Canadian prospector might well be reflected in the Canadian Institute of Mining and Metallurgy, where as yet he has received scant attention. There is no reason why the trained prospector should not take his place

alongside the trained mining engineer in the Institute's deliberations on behalf of the mining industry. If prospectors were more adequately represented in the Institute some of the pressing problems connected with their work, and of vital importance to the mining industry, might receive the attention they deserve at the hands of the Institute.

We bespeak for Canadian prospectors the attention and consideration they have earned and deserve.

### DANGER THREATENS IN SYDNEY

The relation of workers and employers in Sydney, Nova Scotia, is in desperate need of re-adjustment. The recent strike at the steel plant is merely a symptom of a disease that is deep-seated and has spread throughout the larger part of the body of workmen there present. This is what our correspondent says: "Things do not look at all encouraging at the steel plant. The men are in a determined mood. They say their wages are too low and that they must have recognition of their union. A trial of strength has given them a false opinion of their powers and it may be that nothing but a strike will settle things. I cannot think that it will spread to the collieries, as the miners are under contract. However, with the Reds as leaders, anything might happen."

A shrewd and disinterested resident of Sydney writes as follows: "The unrest that I have often spoken of in my correspondence culminated last week in a strike, about which you have full particulars. This caused a loss of at least \$60,000, in wages and probably a much larger loss than that in damage to property, owing to the Steel Company not being able to care for their furnaces, etc., sufficiently quickly. There were no acts of violence, but there were many acts of intimidation; that is, there were large numbers of men at different points acting as pickets that prevented men going to work, who tried to go but did not force their point as they were not sufficiently enthusiastic about going to work to force the issue. Not only did this apply to workmen, but also to stenographers and other girls employed in the company's offices; also to ordinary citizens who were going to the plant in connection with their business, and not to work, and very especially delivery teams that were about to deliver various classes of merchandise to the plant. In this way, law and order were given up and the power and wish of the strikers used instead.

"The matter is now finished, but apparently neither the men nor the company are any more amicably disposed toward each other than before. Unless some rapprochement is made between the parties (whether by the church, the government, or the public, or even themselves) the unrest is still present, and may break out to a much greater extent and with greater violence at any time. This uncertainty and lack of confidence hurts the community from one end to the other."

The anti-social utterances of the Red leader, McLachlan, at the Labour Temple in Toronto on Sunday of this week discloses clearly the immediate cause of the unrest in Sydney. McLachlan and his coterie of brother Bolsheviks preach unqualified revolution in order to attain to ends that are economically as well as socially impossible in this country at this time. We are convinced that this fire-brand labour leader has gone far beyond the bounds of free speech and that he is guilty of license in the eyes of the law.

To prosecute and imprison these misguided Reds and let the case for law and order rest there would, however, be a senseless attempt to right the situation. The Red agitation is merely a symptom of a disease that is deep-seated. The workmen of Cape Breton are a level-headed lot, and were it not for some well-founded sense of injustice that is poisoning their systems, the deadly germs of extremist agitation could not find lodgement.

Last week there appeared in these pages an article describing the attempts of the Colorado Fuel and Iron Company to adjust on an equitable and lasting basis their relations with their employees. We hope that it will require no such catastrophe as occurred in Colorado in 1913 to force in Nova Scotia a similar determined attempt to solve the labour problem. It is interesting to note, by the way, that our present Premier, MacKenzie King, was largely instrumental in formulating the plan now governing the labour relations of the Colorado Fuel and Iron Company. The plan has been in successful operation since 1915.

Where the employees of a large company are scattered in comparatively small units through the country, as for instance is the case of the Imperial Oil Company or the Bell Telephone Company, a solution of the labour problem is comparatively easy to find. Both these companies have succeeded in enlisting the active support and interest of their employees by offering them stock at advantageous rates. On December 31st last 4,318 employees of the Bell Telephone Company were shareholders — over half the total number of the Company's shareholders. The Joint Industrial Council plan is giving excellent satisfaction with the Imperial Oil Company. In both cases the spirit of co-operation has resulted in sick benefits and pensions for employees, and the mutual good-will pays on every score.

Where the workers are segregated in large numbers and are without the leavening influence of a large proportion of workers in other occupations, as at Sydney, the problem is more difficult, but assuredly it is capable of solution. The British Empire Steel Corporation with commendable zeal have set about the task of improving the material surroundings of their employees. First-aid stations, bath houses, safety precautions and cleanliness and order in mine and surface plant have had much attention and a considerable ex-

penditure, and lately the housing problem has been tackled in a thoroughgoing way. We have yet to learn that the personal, human relations have been studied with similar care, and certainly no adequate measures have been adopted to enlist the coöperation of the Sydney workmen.

The labour problem is now the most serious problem facing the British Empire Steel Corporation, Canada's largest and most important metallurgical undertaking. Unless the management of this corporation, from president downwards, takes prompt and effective measures to enlist the coöperation of their workmen in Sydney instead of creating antagonism as at present, the rising tide of dissatisfaction and revolution will overwhelm the industry and cause irreparable damage that will be a disgrace to themselves as well as to Canada.

### EDITORIAL NOTES

Next week we expect to give a resumé of the conference on research held last week in Ottawa, with an estimate of the results attained. Meantime we are able to print today the text of Dr. C. V. Corless' address before the conference, which is considered to be one of the outstanding items of the proceedings. It is a pleasure to be able to record the fact that one of the leaders in our mining industry is thus able to play a leading role in a nation-wide conference on research.

The miners of Sydney, Nova Scotia, have voted against a fifty percent increase in Union dues suggested by their leaders. Red rule may prove to be too expensive for thrifty Nova Scotians.

### "ST. SIMEON STYLITES"

I loaned me rifle to a guy;  
He said he'd treat it well—  
I **took** it back a week ago  
Just rusted plumb to h-ll.  
A feller blew into me shack  
And ast me for me axe;  
He bust his own and wanted mine  
To split his firewood stacks.  
I never seen that axe again,  
It was a good one too;  
But when you're lendin' that's the way  
It always ends for you.  
I loaned a man me name acrost  
A promissory note.  
The man fell down; I lost me name:  
The banker grabbed me goat.  
I'll never lend the loan of naught,  
And I'll not borry neither:  
I'll be the only bird on earth  
That damn well don't do either.

J. C. M.



# Hudson's Bay Bill

By TOM SAVILLE

We were in Montreal for "The Big Event". It was the evening of the opening day and already the Big Wigwam was filled to capacity — and already East and West had locked horns over the liveliest of issues, Institute Membership Policy. Strangely enough the battle cry of both sections was one and the same. The West had sent their ablest and best to give battle to the Secretary's proposals and as matters now stood, about the only advantage we of the East had was fighting them on our own ground.

We were having dinner, members from the North, South East and West, our battles for the day were over and we were boys again, glad of the opportunity of enjoying each other's company in all good fellowship.

Nicholson, a Western member, and myself were discussing the mysterious disappearance of Lionel Mortimer. Mortimer had been the guiding genius of the Western faction and had come east about a year ago and had taken charge as examining engineer for the Pioneer Exploration Co. He had already been successful in landing several interesting looking properties and was going strong when in the fall he ran across a prospector known in the North as Hudson's Bay Bill, who shows him some good looking kaolin he has run across down on the Missinabi. They left, just the two of them, to make an examination, expecting to be out before the freeze up, and that's the last we heard tell of them. Search parties have been sent out, but have returned with no news. The prospectors still maintain that Hudson's Bay Bill will show up yet, unless he has cashed in from sickness, as he is a regular wizard of the woods and sure knows the way to look after himself. However, it looks like "Good night" to the both of them.

While we are lamenting his loss a boy hands Nicholson a telegram, which he read aloud. "Have arrived Cochrane, Ontario, hale and hearty. Hope to meet you opening day, Big Event, Montreal. Lionel Mortimer." And while we are cheering the good news, in walk Mortimer himself looking the same as his telegram states, hale and hearty. We sure give him a great old shake and he is soon the centre of an eager crowd expectantly waiting to hear how he escaped "the relentless clutches of the inhospitable North." Mortimer is quick to sense this, and after some more chairs are brought in he begins.

"Late last fall, a prospector known as Hudson's Bay Bill met me on Big Appitipe and showed me some samples of good looking kaolin which he tells me he got on a river running into the Missinabi, Kawa-pa-ska-ka-ming. Having heard on good authority that an extension of the P. & T. would shortly run through that country, I decided to look it over before the freeze up. I asked Hudson's Bay Bill what he thought about getting out before the freeze up, and he says we can make it but it will keep us a-humping. I was in great shape after my simmer's work which had kept me on the trail almost continuously, and I could see that this prospector was trail hardened too. So we got an outfit from the H. B. Co. and took to the river down stream and outside of running some ugly looking rapids the trip to the discovery was uneventful.

"I examined the outcrop and Hudson's Bay Bill informs me there is another exposure to the West, but that we had better be getting south as the geese were on their flight and that we had better follow them. But the weather was fine and after coming this far I thought I would see everything possible. So we made a cache of our outfit, taking only a light tarpaulin for a lean to at night, and only the barest necessities in the way of provisions, intending to make a dash for it. We made it all right, took some samples for analysis and was within a short distance of our cache when it started to storm, snow and blow, which made very slippery walking.

"We were working our way though a windfall and you know what that means, we were off the ground half the time. Hudson's Bay Bill was a little ahead of me, walking like a bear—in-toes along a down tree—and I was just wishing I had that accomplishment myself, —when, Bingo, I slip off and down between a couple of logs — and break my leg.

"We both realize we are up against the real thing—frozen in without an outfit; but it don't seem to worry Hudson's Bay Bill, who first packs me to a good place to make permanent camp — wood, water and protection from the north wind, which, of course, means facing south. He soon has me on a thick spruce bough bed alongside the fire and sheltered from the storm by the "puckwan" or lean-to and is working over my leg which he sets and puts in a plaster cast made out of kaolin and rabbit hair, and after he makes me as comfortable as possible starts to split some jack pine to build a camboose, right over me and the next day he has the roof on and I am laying alongside a cheerful fire inside one of the neatest little camps I have ever seen.

"It was still storming, but Bill had got the best in the first round. I could see it was going to be a battle, but I had faith in Bill's ability to win out. Well it's a long story, but an interesting one (the details of which you will get in my paper 'Prospectors at Close Range') of how we lived off the country and lived good without a gun; of how we made winter clothes and footwear from the skins of animals he caught and tanned; the snowshoes and toboggan Bill made with home-made tools; and best of all how in those long winter evenings while he would be sewing or making some useful article he would make me forget the pain and misfortune of being confined to camp, with his stories and his fine sense of humor.

"I can assure you I had an excellent opportunity of getting 'a close up' of the Prospector. I learnt that Hudson's Bay Bill was not an exception, but one of many red-blooded men who are playing the 'Big Game'. I learnt that the majority of them are in the 'Game' not because it is the best paying one, but because it affords better opportunities for service to their fellowmen. I saw prospectors studying Dana and Miller by the light of their campfires. I have met prospectors who had travelled for days to hear Dr. Goodwin tell the 'Big Story' to his prospectors' classes.

"Now, gentlemen, these are the men whose efforts to improve themselves I was working against in the



# Bulletin and Journal

## CORRESPONDENCE RELATING TO A PROPOSAL TO COMBINE THESE PUBLICATIONS

*In November last Mr. J. J. Harpell, managing director of the company that publishes the "Canadian Mining Journal", offered to the Canadian Institute of Mining and Metallurgy the use, without cost and without restriction other than that which binds both Institute and "Journal" in the service of the mining industry, of a sufficient number of pages in the weekly issues to publish the technical papers and announcements and whatever other material the Institute deemed advisable. The following letters from Mr. MacKenzie, on behalf of the Council of the Institute, and from Mr. Harpell are self-explanatory after this introductory note.*

Montreal, December 12th, 1922

J. J. Harpell, Esq.,  
Industrial & Educational Publishing Company,  
Gardenvale, Que.

Dear Mr. Harpell,

The proposal for combining the "Monthly Bulletin" of the Institute with the "Canadian Mining Journal" was laid before the Council of the Institute on December 8th., and, after the matter had been very carefully reviewed and considered from all angles, Council decided that it would not be in the best interests of the Institute to carry out the proposed publishing combination. I might add that the whole matter has been carefully considered by the Council at large, and also by the Council Meeting on November 17th, in Vancouver, B.C., the consensus of opinion being that the Institute would lose its present contact with Branches and individual members through the adoption of the scheme which we have been discussing.

Notwithstanding the fact that we cannot get together on this proposition, for the present at least, I feel confident that the friendly relations which have previously existed between the "Bulletin" of the Institute and the "Canadian Mining Journal" will continue indefinitely.

Yours faithfully,

GEO. C. MACKENZIE,  
Secretary-Treasurer.

Gardenvale, January 8th, 1923.

Geo. C. MacKenzie, Esq.,  
Secretary-Treasurer,  
Canadian Institute of Mining & Metallurgy,  
603 Drummond Building, Montreal.

Dear Mr. MacKenzie:—

Your letter of the 12th ult. reached here during my absence and since my return I have delayed answering it until I had an opportunity, which you were good enough to give me on Friday, of examining the minutes of the last meetings of the council.

I am sorry that the proposal to combine the "Bulletin" of the Institute with the "Canadian Mining Journal" has been turned down. The Canadian mining industry is not large enough to support two jour-

nals, and the effort to force two upon it has simply resulted in weakening the service that might be given by one and in piling up a liability against the Institute of Mining and Metallurgy which has undertaken to finance the other.

I wonder how many members of the Institute are aware of the fact that your total expenditure for 1922 has been over \$36,000 and your total revenue less than \$25,000 and that every cent of this heavy deficit, namely over \$12,000, has been occasioned by your effort to build up a competitive Canadian mining publication? In one year you have spent the greater part of the surplus built up at great pains during several years by your predecessor and it will require less than one more year of such expenditure to put the Canadian Institute of Mining and Metallurgy into bankruptcy.

When this serious condition was discovered by the members of your council a few months ago it created something of a panic that occasioned negotiations with us looking to the amalgamation of the "Bulletin" with the "Mining Journal." What has happened in the meantime? The minutes of the last meeting of the council tell the tale. You presented a budget, just as you did last year, supported by rosy prognostications of what you can accomplish in another 12 months and have succeeded in persuading the few members that were present to adopt your programme of promises and hopes of an inexperienced and heretofore unsuccessful publisher. You have persuaded them to authorize a contract for printing amounting to \$6,000 which any shrewd buyer of printing could get for \$3,000 at the present time. Last year it took \$36,000 to meet your bills. In your budget of 1923 you say you can keep the expenses of the Institute under \$21,000 and you immediately start on a road of greater extravagance and unnecessary expenditure than you did in 1922.

Mac., you have either lost your senses or you are out to wreck the Institute. The members should know the facts and be given an opportunity to have a say in what is as much their affair as it is yours and the half dozen or so members of the council that you gather in occasionally to endorse your programme.

Why have the minutes of your council not been published in the "Bulletin," which circulates only among the members? Why? Because they would raise a storm that could not be weathered by the present management. But notwithstanding the friendly, and even close personal relations that exist between the writer and many of those who may be affected, I consider it my duty, as a member of the Institute of many year's standing, to force all cards to be laid on the table, to give every member a full and complete knowledge of the facts so that at the next annual meeting they may deal with the whole matter as they see fit.

I am, therefore, writing this reply to yours of the 12th ult. with the intention of publishing both in the "Canadian Mining Journal" and I will be very glad to publish at the same time any reply you may feel you would like to make to this letter. You are free to publish my letters in any publication you wish.

I know you feel that this matter, if it is to be made

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west — the men I was trying to exclude from a source of inspiration that rightfully belongs to them,—and I have now learnt is the birthright of all legitimate members of the mining family — full membership in the Canadian Institute of Mining and Metallurgy."



public, should be continued to the readers of the "Bulletin". But it is not only of interest to the members of the Institute but of vital importance to every member of the Canadian mining industry. Judging from the long lists of cancelled memberships you have shown me I am satisfied that there are many ex-members of the Institute who are just as anxious that the Institute be reestablished along the lines of its former usefulness as are present members — probably more so.

The "Bulletin", being the organ of the Institute, ~~is read only by present members~~. The "Mining Journal", being the recognized organ of the Canadian mining industry is or may be read by everyone interested in the welfare of the industry, including not only all present members of the Institute but ex-members and prospective members as well.

It is the duty of the secretary of all public and semi-public organizations to be guided in his course of action by fundamental principles, generally acceptable to the constituency he is appointed to serve, and I am going to open this discussion by calling to your attention how completely your course of action violates an important principle generally, if not unanimously accepted by the Canadian mining industry. The mining industry of this country has always been opposed to any interference with private ownership — it has stood for intelligent individualism. But the effort you have been making during the last year to displace the "Canadian Mining Journal" with the "Bulletin" is directly opposed to this principle. How would any mine owner feel if the Institute of which he was a member began to operate a competing mine with Institute funds? The men who invested their money to establish the "Canadian Mining Journal" are, (or were up to the time of their death) all members of the Canadian Institute of Mining and Metallurgy. They are as follows:

Alexander Longwell, Toronto.  
Dr. Milton L. Hersey, Montreal.  
J. B. Tyrrell, Toronto.  
Prof. S. F. Kirkpatrick, Ottawa.  
Prof. J. C. Gwillim (now the estate of)  
Eugene Coste, Calgary.  
L. H. Timmins, Montreal.  
Dr. James Douglas (now the estate of), New York.  
J. J. Harpell, Gardenvale, Que.

In investing their money in this venture each of these men was influenced more by a desire to keep the old "Mining Review" from being purchased by an American company and to provide a creditable Canadian mining publication than by any opportunity it offered for investment. As a matter of fact the "Canadian Mining Journal," by itself, has never proved a profitable venture. The above mentioned shareholders, who still have their original investment, can tell you that they did not receive regular dividends until after the company owning the "Mining Journal" went into the printing business.

So long as the "Bulletin" was no more than a bulletin it did not compete with the "Canadian Mining Journal", but during the last year the "Bulletin" has been, in all essential particulars, a magazine with an editor and an advertising solicitor, and the Institute by publishing the bulletin, at heavy financial loss, has really devoted its greatest effort and energies to the business of publishing which is not, I think you will admit, the most important duty of the Institute.

Even though you should succeed in accomplishing your purpose what will you have to show for the money spent? Nothing more than a monthly bulletin — a house organ that circulates only amongst the members of the Institute. Because of this limitation it can never exercise much, if any, influence in attracting attention to the mineral resources of the country nor can it be of service to the 70,000 workers in the industry beyond the 1,000 or so who are members of the Institute.

The Canadian Institute of Mining and Metallurgy is the only industrial society in Canada that receives a Federal subsidy. If the government knew that this subsidy was being used to compete with a private industrial undertaking it is doubtful whether it would be continued. If the Institute wishes to go into the publishing business it has no right to a Federal subsidy. I might have hesitated to so express my feelings on this matter were it not for the opinion you voiced on Friday, namely that this subsidy had frequently deterred the Institute from being more aggressive in their dealings with the Federal Government when the interests of the Institute demanded.

This opinion removes an obstacle that deterred me from opening up the whole matter a year ago when you asked the Institute for authority to embark on your publishing enterprise. But now that you have had a whole year's experience without getting any nearer your goal than you were when you started, the members of the Institute should at least know what it has cost them and have an opportunity to consider whether or not they wish to continue to finance your publishing enterprise. They should also know that for many years the Industrial & Educational Publishing Company, which is the owner and publisher of the "Canadian Mining Journal", printed the "Bulletin" for the revenue from the advertisements it carried which was as follows:—

|               |            |
|---------------|------------|
| 1918 .. . . . | \$1,615.18 |
| 1919 .. . . . | 1,584.52   |
| 1920 .. . . . | 2,024.65   |

On this basis, of course, there was a loss of from \$1,000 to \$2,000 a year which was absorbed by the Industrial & Educational Publishing Company, Ltd. In 1921 you had complete charge of the advertising and the Industrial & Educational Publishing Company did the printing for the Institute at a total cost of \$3,407.87.

In 1922 you took the printing of the "Bulletin" away from the Industrial & Educational Publishing Company, Ltd., and paid from two to three times what it cost in 1921, notwithstanding that printing costs in 1922 were very much lower than during any of the four preceding years. Your revenue from advertising was about the same as it had been during the previous year notwithstanding the strenuous and expensive effort you made to increase it. The deficit on mechanical costs alone in 1922 was unnecessarily high.

I should like to have the members of the Institute compare the "Bulletins" for the four years during which the Industrial & Educational Publishing Company printed them with those of 1922 and say if the publication under your management is worth from three to five times what it was during any one of the four previous years. The only apparent difference is one of type face which, of course, does not mean a dif-



ference in cost. That is simply a matter of taste and it is doubtful if the change you have made in this respect can be considered in the nature of an improvement. Then you must not forget that the Industrial & Educational Publishing Company has built up one of the largest printing businesses in Canada within a comparatively few years. This could only be done by giving service and a quality of printing at least equal to that of its competitors.

I do not quite understand why you should be so anxious to spend so much of your time on an effort to displace the "Mining Journal" with a publication financed by the Institute. It is certainly not because there are lacking suitable activities for the secretary of the Institute. The fact is that the Institute is not now a vital force in the industrial life of the country as it should be. During the last few years there have been many occasions when the interests of the mining industry demanded the attention of some representative on freight rates, tariff classifications, and so forth and on each occasion the Institute remained unrepresented, although all the other important organizations had representatives present. By tariff classifications I mean the proper classifying of mine products for freight schedules. When a shipper receives his freight bill he has no power to change the class in which he finds the commodity placed from a given point of shipment no matter how unjust such classification may be. This is a technical matter of much importance to the industry and should be carefully watched and studied by the secretary of the Canadian Institute of Mining & Metallurgy.

A dozen activities could be mentioned that could better occupy the secretary's attention than the publishing of a magazine. For instance, there is the training and general aid to prospectors which has never yet been undertaken seriously in Canada. It is the "Canadian Mining Journal" and not the Institute that now has this undertaking under way though it is more properly the concern of the Institute and any surplus which the Institute may have should be spent upon work of this kind.

But the above mentioned are not the only developments of vital moment to the Institute arising out of your publishing enterprise. In your desire to corral manuscript for your "Bulletin" to the exclusion of privately owned mining publications, you prepared and had passed at the last meeting of the council, a minute which amounts to a vote of censure of Mr. T. A. Rickard for allowing the "Engineering & Mining Journal-Press" to publish the paper he read at the western meeting of the Institute at Vancouver before it appeared in the "Bulletin." If your interests in the welfare of the Canadian mining industry transcended your desire for the aggrandizement of your "Bulletin" you would have been glad of any attention that the "Engineering & Mining Journal-Press" gave the Vancouver meeting and Mr. Rickard's paper. You certainly must know that if a weekly mining publication had to wait for a month or more until Mr. Rickard's paper appeared in your "Bulletin", little or no attention would be given to it, and the Canadian mining industry and the Vancouver meeting would be the losers thereby.

If your heart had not been so centred in the "Bulletin" you would have recognized in a more fitting manner the courtesy Mr. Rickard did the Vancouver meeting instead of taking a course that must neces-

sarily be resented by his hosts, the Western members of the Institute. You surely must have known that if your desire for prior publication had been made a condition of Mr. Rickard's presentation of his paper at the Vancouver meeting he would hardly have accepted the invitation in view of his experience with the "Bulletin" of the American Institute of Mining and Metallurgy. When the council of the Institute could not afford to send you, or any other representative to the Vancouver meeting because your expenditure on the "Bulletin" had depleted the treasury, you should have refrained from creating an awkward situation for those who did go.

According to the records of the last meeting of the council your solicitude for the "Bulletin" has created a situation making it difficult for the Nova Scotia Mining Society to continue the good relations with the Institute established by your predecessor, and under the circumstances you should have avoided a course likely to alienate another important section.

The minutes of the last meeting of the council disclose another action of far reaching consequence to the industry. I refer to the acceptance of a thousand dollar donation from a large mining company and to a minute calculated to politely advise other mining companies that the hand of the Canadian Institute of Mining and Metallurgy is out for further gifts. Membership in the Institute is no longer of equal value and serious misunderstandings are bound to arise if this course of action is adopted by the Institute. On all these questions the members should have full information.

Through the columns of the "Bulletin", or in some other way, the members should be supplied with a full financial statement of each of the five years preceding December 31st 1922 together with an outline of the financial requirements for 1923. This statement should disclose the amount of the reserve at the end of each year. Each member should be supplied with a copy of the minutes of the last two or three meetings of the council of the Institute. There is no reason why these minutes should not be published regularly.

I make these suggestions believing that your frantic effort to continue the publication of the "Bulletin" is fraught with the greatest danger to the Institute. It is calculated to wreck the Institute and it will not take many more months as things are going now.

Before the Institute embarked upon its publishing enterprise it did a valuable work for one of the country's most important industries. There is still much good work for it to do and it is the duty of every person who has the best interests of Canadian mining at heart to save the Institute.

Yours very truly,

J. J. HARPELL.

Montreal, January 31st, 1923.

Mr. J. J. Harpell,  
Garden City Press,  
Gardenvale, P.Q.

Dear Mr. Harpell:—

Your communication of January 8th on the subject of Institute matters was laid before Council on January 17th and I have been instructed to write to you as follows:

(1) You state that at the end of 1921 Council took away from your Company the printing of the monthly "Bulletin"

At the end of 1921, your Company, among a number



of others, was asked to submit tenders for the printing of the "Bulletin" and the "Transactions" for the year 1922 notwithstanding the fact that you had, during the year 1921, given the Institute to understand that at the termination of your 1921 contract you did not desire to renew the same. You did tender for the "Transactions" but did not tender for the "Bulletin" and your failure to do so resulted in Council placing the printing contract with another company. Having ignored Council's request for your tender you are hardly in a position to state that the contract was taken away from you.

(2) You state that during the past year Council has published the "Bulletin" with the idea of displacing the "Mining Journal" and you assert that this competition was characterised and inaugurated with the appointment of a "Bulletin" editor and advertising solicitor.

You are reminded that the "Bulletin" has always possessed an editor and an advertising solicitor. Prior to 1921 the editor was the Secretary-Treasurer of the Institute and while at times paid advertising solicitors were employed the most active agent has always been the Secretary-Treasurer. Commencing with 1921 the editorial and secretarial duties of the Institute was separated in order that the Secretary-Treasurer could devote his whole time to secretarial duties and throughout 1921 and 1922 a paid advertising solicitor was not employed.

You fail to specify in what manner the "Bulletin" has competed directly with the "Journal" and should you care to pursue this subject further Council would be glad to be enlightened. In the meantime, you are referred to two editorials in the "Bulletin" issues of November and December 1921 on pages 947 and 1031 respectively, in which you will find the matter thoroughly covered.

(3) You refer to the present financial condition of the Institute, insinuating that this condition has been brought about suddenly. You also state that Council having recently discovered this situation approached your Company with a proposal to combine the "Bulletin" with the "Mining Journal."

If you had read the report of Council published in the February Bulletin 1921 you could have ascertained that Council had, as early as the fall of 1920, anticipated financial deficits for several years in advance and had fully explained the reasons for these expected deficits. You are, moreover, advised that Institute finances were repeatedly mentioned in articles that appeared in the monthly "Bulletins" throughout 1921 and 1922. Council would refer you particularly to the February, March and November Bulletins of 1921 and to the February, May, October and November Bulletins of 1922. Council would remind you that the proposal to combine the "Bulletin" and the "Mining Journal" originated with yourself and not with Council, nor were you ever approached on this subject by the present Council. Council were favorably disposed toward your proposal until it was shown conclusively that the most economical course to pursue was to continue the publication, in limited form, of the "Monthly Bulletin". This decision was made only after the whole question of Institute finances had been carefully reviewed by meetings of Council in Vancouver and Montreal.

(4) You ask why the minutes of Council have not been published in the "Bulletin."

Council would refer you to the procedure of the Institute for many years which contains no precedent for the adoption of your suggestion. Minutes of Council are always open to members at Headquarters and any member distant from Headquarters can see copies of these minutes on application to their representative Councillors. Furthermore, Council does not believe that anything would be gained by printing its minutes in the "Monthly Bulletin." All the forty members of Council are regularly supplied with copies of the minutes. These members are scattered across the country from Halifax to Vancouver and being constantly in touch with branch organizations it is recognized and accepted that distant members of Council will bring to the attention of branch executives anything in the minutes that requires their attention.

(5) You refer to a recent minute of Council recording Council's appreciation of cash donations to the Institute from individuals and corporations and you charge that in accepting such donations Council has established a practise that will affect the quality of membership.

Council would remind you of the established practise of the Institution of Mining and Metallurgy of Great Britain which has, in recognition of its services to industries, accepted on many occasions cash donations from individuals and corporations without injury to the quality of its membership.

(6) Your reference to a minute of Council covering the matter of Mr. T. A. Rickard's discourtesy to the Institute has been duly noted.

When Mr. Rickard consented to present a paper to the Institute he was fully conversant with the long established precedent requiring that such contributions, as a matter of ordinary courtesy, should first be placed at the disposal of the Institute. However, Council has, at the request of the British Columbia Division, re-considered this matter because it is probable that Mr. Rickard may have been unaware of Article 50 in the Institute By-laws. Council has therefore consented to the printing of Mr. Rickard's paper in the February issue of the "Bulletin."

Yours faithfully,

GEO. C. MACKENZIE,

Secretary-Treasurer.

## SYMPOSIUM ON FUEL

The outstanding feature of the technical sessions of the Canadian Institute of Mining and Metallurgy in Montreal next week will be, of course, the symposium on fuel. The papers on fuel have been prepared by the most competent authorities it has been possible to obtain, and their conclusions are worth the serious attention of all connected with the fuel problem — which includes the majority of Canadians. If the discussion of these papers is of corresponding importance, the Institute will have rendered Canada a notable service at its Annual General Meeting for 1923.

By reason of the virtual cessation of coal production in the Ruhr coal district, coal shipments from England and Scotland to both France and Germany have been increased to a marked extent, and prices have gone up.



# Research\*

## IN CONNECTION WITH THE MOND NICKEL COMPANY'S OPERATIONS

By C. V. CORLESS\*\*

### Outline of Operations

Since there may be some present who have only a very general knowledge of the mining companies operating in Northern Ontario, I will preface my remarks on research by such general statements regarding the Mond Nickel Company's operations as may throw light on later references to these.

The Mond Nickel Company, with head office in London, England, is the second largest producer of nickel in existence. It operates a number of mines and a reduction plant in the Sudbury District; refineries in the United Kingdom; a rolling-mill for nickel and one for nickel alloys, together with some other allied plants, in Birmingham, England; and has an interest in a rolling-mill in Clearfield, Pennsylvania.

All the ores produced in the Sudbury nickel area are sulphides of nickel, copper and iron (known technically as pentlandite, chalcopyrite and pyrrhotite), mixed with varying amounts of rock matter, and containing minute quantities of the precious metals and rare metals of the platinum group.

The Company's reduction plant, which is a few miles east of Sudbury, at Coniston, on the Canadian Pacific and Canadian National Railways, consists of a smelter, a sintering plant, and a concentrating mill. The final product of this reduction plant is bessemer matte, containing over 80 per cent. of nickel and copper, 14 or 15 per cent. of sulphur, a varying percentage of oxygen, a few tenths of a per cent. of iron, and small amounts of precious and rare metals, much too small to be expressed significantly in percentages.

This bessemer matte is shipped to the Company's refinery at Clydach in the Swansea Valley of South Wales, an important metallurgical center. Here the nickel and copper are separated, the former being refined by the carbonyl or Mond process which yields the purest nickel sold (99.8 to 99.9 per cent. nickel) and the latter being sold as copper sulphate, chiefly as an insecticide and fungicide for use in the vineyards of Southern Europe. The residues from this refining process, containing the minute proportions of the precious metals, (gold and silver) and of the rare metals of the platinum group (platinum, palladium, iridium, rhodium and ruthenium) are separated and refined at the Company's plant in London.

### Uses of Nickel

As is well known, nickel finds a very wide market as an alloying metal, chiefly with steel, but also with copper, chromium, manganese, and a number of other metals. Owing to the unique and valuable properties of nickel, it is finding wide uses in the manufacture of containers, utensils, piping, wire, machinery parts, scientific and industrial apparatus, etc., where its peculiar combination of properties, viz., great strength, capacity for receiving and retaining a high polish, great resistance to corrosion, abrasion and oxidation, or other special qualities, are required. It is also used extensively in electroplating, for coinage purposes, and as a

catalyst in certain reactions in industrial chemistry, besides having a large number of miscellaneous uses.

The Company has spent and is spending large sums of money in studying the physical and chemical properties, in investigating the best methods of manufacture, and in searching out the widest and most suitable fields for use, of nickel and its alloys. Some of these investigations are carried out at the plants in Birmingham and Clearfield already mentioned.

### Use of Research in Connection with Ordinary Operations

It perhaps need hardly be said that each of the plants mentioned has its chemical laboratory. The laboratory is the handmaid of every metallurgical process from the milling and smelting of the ore, through the various steps in further reduction and refining of the metals, and onward into the manufacture of the metal into sheets, bars, wire, tubes, etc., whether these are of pure nickel or of nickel alloys. In investigating these final forms, so as best to adapt the metal or alloy to the particular use for which it is intended, frequent physical tests are applied; for example, tests for electrical resistance, tensile strength, brinell hardness, etc. These tests have to be correlated with both the chemical composition of the metal and the physical and mechanical treatment the metal has received. Half a dozen or more chemical laboratories, with some of the less expensive apparatus for physical testing, are in constant use at every stage between mine and consumer. Some of the larger physical and mechanical tests, which are used less frequently, requiring very costly apparatus, are made, when advisable, in University or other similar laboratories for testing such materials.

It is not the purpose of a brief non-technical paper, such as the present, to do more than to give a broad outline of the place of research in a mining and metallurgical industry and to indicate the indispensability of accurate and systematic chemical analysis, physical testing, observation, recording of data, and of correlation and drawing of reliable conclusions from a close study of them, which, with the applied scientist, is one form of research. Without this continuous, painstaking, systematic, detailed following up of daily metallurgical operation; without the most careful study and correlation of the masses of accurate data by scientifically trained men who devote their time to this work; without the drawing of conclusions based on these studies, which sometimes extend over many months; and unless these studies result in decisions to make operating experiments, frequently on a full working scale; there would be but little metallurgical progress.

### Special Industrial Research — Origin of the Mond or Carbonyl Process

But there is a further important aspect of industrial research, well illustrated by the early development of the refining process used by the Mond Nickel Company, which is known as the Mond or carbonyl process for refining nickel. The story of this development is probably familiar to any metallurgists present. Since it may not be so well known by others, I will briefly outline it.

In laboratories having as their chief aim the appli-

\* Address given before Research Conference, London, Feb. 21st.

\*\* Director and Manager of The Mond Nickel Company, Ltd.



ration of scientific discoveries to industry, quite frequently important discoveries are made in pure science. Research men in such laboratories keep abreast of advances in science just as do others engaged in research work merely for the advancement of knowledge. When such purely scientific discoveries are made, after verification, they usually find their way through the ordinary channels to the general stores of scientific knowledge. Sometimes unexpected phenomena are observed which it may be necessary merely to note "en passant". These phenomena may form the starting point of fresh researches into their scientific meaning and into their practical application, if any.

It was thus in Dr. Mond's laboratory in England that a scientific discovery was made which formed the starting point of the carbonyl process for refining nickel. A mixture of hydrogen and carbon was being passed over heated, finely divided nickel in order to remove the carbon monoxide. To obviate danger from the poisonous monoxide, the escaping gas was ignited. As the apparatus cooled it was observed that the burning of the escaping gas produced a luminous flame which deposited a film of nickel on cold porcelain, very similar in appearance to the well-known arsenic mirror used as a test for the latter metal. A test showed this deposit to be pure nickel and further investigation revealed the existence of a hitherto unknown compound of nickel and carbon monoxide,  $\text{Ni}(\text{CO})_4$ , which received the name nickel carbonyl. This compound is formed by passing carbon monoxide over metallic nickel at about  $50^\circ \text{C}$ . but is again completely decomposed into nickel and carbon monoxide when heated to  $150^\circ \text{C}$ . or higher.

These are scientific facts. As such they merely increased the sum of human knowledge. They were discovered incidentally in the course of research carried on with ultimate industrial aim. But in the fertile brains of Dr. Mond and Dr. Langer — both men gifted with scientific imagination and indomitable determination, the one having already won by previous investigations and applications of science to industry practically unlimited capital which enabled him to back the other, who had deep scientific insight combined with great originality and inventive genius — in this fertile soil, these scientific facts proved to be seeds that quickly germinated. But though the germination was quick, full development required much time, faith, courage and will. There followed a period of more than ten years of patient research, invention and construction, during which boundless faith, a faith which was literally "the evidence of things not seen" except in scientific imagination, was the impelling force. Finally an ore body was bought in the Sudbury District, three thousand miles distant, at a time when the future of the district was by no means assured; a mine was developed; a smelter built; in order to test the commercial value of the new process. This was nearly twenty-five years ago. I need only add that since then ample ore reserves have been secured, a new and more adequate reduction plant has been built, and the carbonyl process is now annually producing as a refined product thousands of tons of the purest nickel marketed.

It might be difficult to find a better illustration of the great importance of research to any nation whose people have the ambition to rise above the economic status of being "hewers of wood and drawers of water" among the nations of the earth. It is scarcely necessary to add that those responsible for the conduct of a business born of scientific research, developed by scientific research, nurtured by scientific research, and making every step in its progress by scientific research, nat-

urally regard scientific research as the key stone of success in production or in material progress in any direction.

### The Scope of Scientific Research

But I should like to add a few words in criticism of a tendency to narrow the use of the term scientific research to laboratory dimensions. If search in a laboratory by scientific means, let us say, for a method of recovering radium, or a few millionths of one per cent. of some other rare constituent (as is the case with several of the rare metals in our ores) — if this search may properly be spoken of as scientific research, why may we not apply the term with equal correctness to the search in the field by equally systematic and accurate means for the orebody containing millions of tons of ore, from which these and other metals are to be recovered? Search for geologically promising areas; in the Sudbury Nickel Area, further systematic search of such areas by extensive magnetometric surveys; careful recording of the observations, and plotting and study of the magnetic contours; systematic search of magnetically promising ground with the diamond drill, accompanied by accurate examination, sampling and analysis of the drill cores; careful recording, correlation and interpretation of the data thus brought to light, leading to the discovery of an important orebody: why can not a discovery of this kind by such means be placed to the credit of scientific research?

The crucial elements of scientific research, to my way of thinking, are: accurate observation; when necessary, assistance to observation by carefully planned testing or experimenting under known conditions; accurate recording of observed phenomena or facts observed, with correlation of the phenomena or facts observed, with other known facts or laws; if possible, clear interpretation of the observations; and, whenever possible, further testing of the interpretation. The search for new phenomena, new facts, or a new natural law may be among the stars, in the crust of the earth, within a chemical or physical atom, in human society, on a farm or in a garden, in an animate body or one of its organs, in the human brain or the mind itself — it matters not what the field — nor does it even matter what the ultimate motive — provided that the search will stand these tests, it becomes scientific research. This is the most powerful method yet discovered for solving our problems and making intellectual and material progress. It is equally applicable to the discovery of the phenomena and laws of nature, made with no ulterior motive beyond the advancement of knowledge; and to the discovery of the application of these laws in industry, with possibly a somewhat sordid immediate motive, but with the ultimate end in each case that human knowledge is broadened and humanity itself benefitted. It is the intelligence and intellectual honesty, rather than the motive, of the investigator, that determines whether or not a given investigation is properly to be classed as scientific research. Probably few scientific specialists engaged in research ever stop to analyze their own motives or to consider how complex these really are. If a research adds to the sum of accurate organized or organizable knowledge, it may, thus far, I think, properly be classed as scientific, even though it may be industrial in its aim. More and more as the domain of science widens is it found that accurate knowledge of almost every description finds a place in the scheme. As the human mind continues to widen its grasp of its surroundings, no doubt it will come to be admitted that every accurately ob-



served phenomenon or ascertained fact will find its place in the scheme of organized knowledge, which is science.

### Cultivate the Impulse for Research

This method of inquiry should be widely inculcated. It should become a national habit of mind. Indeed, the chief intellectual aim of educational institutions should be to fix in the minds of as large a percentage as possible of those passing through them this habit of inquiry, with insight into the means of satisfying it. The farmer who plants two similar measured plots of ground, one having a single altered condition, the other serving as a control; who keeps an accurate record of the result; and who draws a reliable inference from the experiment; is pursuing scientific research as surely though not as importantly, as is the physicist who, through the liquefaction of helium, achieves the closest approach to absolute zero yet made; or as is the graduate in medicine, working in a pathological laboratory, who discovers new means of diagnosing, preventing or alleviating disease. But the farmer will be greatly assisted, if, in addition to an intelligent insight into how to conduct such an inquiry, he has at least such knowledge of elementary science as will assist him to acquaint himself with what has already been accomplished, as well as to eliminate useless experiments. What is really needed in this direction is a change in our national mental attitude. In education having this end in view, it is not so much the quantity of knowledge imparted that counts, as the widespread stimulation of scientific curiosity and love of accurate knowledge, with insight into how to proceed to satisfy this desire.

The general kindling of the spirit of scientific inquiry or research is only one aspect of the national problem. The other centers round the importance of extending, in every way within national means, those researches carried on, either within or outside of our university and government laboratories, in larger private laboratories, on experimental farms, in connection with our soil, our forests, our minerals, or our fisheries, or elsewhere. These researches aim to widen the boundaries of knowledge by a study of natural phenomena, or of the laws expressing their relations, or of the best and most efficient means of controlling nature in the interest of man.

This work is generally highly specialized and sometimes costly, though the cost is usually very small relatively to the value of the results achieved. Its national success is conditioned on two factors: adequate financial support; and efficient means of selecting and training those gifted with special ability for conducting such investigations. The latter is clearly conditioned on a national scheme of scientific education as already discussed, if it is to reach the highest success. The aim of the present Conference is doubtless to emphasize the national importance of scientific research. Of even more fundamental importance is it that there should gradually be created, through education in the broadest sense, a wider interest in scientific inquiry, as the most solid and sure foundation of national material prosperity and well-being that can be laid.

A prospecting expedition into that part of New Guinea formerly in German hands, and now under mandate to Australia, has disclosed what promises to be an important placer gold and platinum field. Concessions have been granted on the Waria river in Morobe district.

### THE INSTITUTE'S PRESIDENT

Mr. W. R. Wilson, President of the Canadian Institute of Mining and Metallurgy, is one of the foremost of Canadian mining engineers. Born and bred in a colliery district in England, his experience in coal mining actually began in childhood. On the foundation of a generous technical education and an initial practical training under a father who was himself an eminent mining engineer, he has built a reputation that has spread through three continents. After an initial experience in Nova Scotia Mr. Wilson advanced to positions of responsibility in English col-



Mr. W. R. Wilson

lieries. Then his services were requisitioned for use in Pennsylvania. From Pennsylvania he came to Fernie, British Columbia, where he laid the foundations broad and deep for the colliery development that he now directs. South Africa next claimed his services for three years, when Canada regained him. Twelve years ago Mr. Wilson took hold once more of the Crow's Nest Pass Coal Company, and now has developed the collieries round Fernie into one of the principal producing districts in Canada. The Institute has been fortunate in having Mr. Wilson as its President during the past year.

During 1922 Australia produced 758,303 ounces of gold as against 757,431 ounces in 1921. Two-thirds of this came from West Australia. Ten years ago the production was over two million ounces. Lack of new mines and the high cost of labour and material are held accountable for this decline.



# News and Comments

BY ALEXANDER GRAY

## Hollinger Consolidated Makes New Record

The twelfth annual report of Hollinger Consolidated Gold Mines makes further standards of excellence. In 1922 the gross production from 1,491,381 tons milled was valued at \$12,726,549.77. As that brought the Hollinger grand total since the beginning of milling operations, to \$62,747,529.32 (of which \$60,566,025 was recovered) it calls for no elaboration or encomiums to convince the student of mining statistics that the presentation bears the stamp of authenticity plus an assurance of more than ordinary longevity.

Not only did Hollinger in 1922 produce nearly as much gold as the whole of Canada did a year or two ago, but the further \$43,269,827 contained in the proved and indicated ore reserves makes the grand total gross value of what has been extracted and what is practically in sight, \$106,017,356. Year after year these mines have gone from peak to peak, despite recurring

|                                    |                 |
|------------------------------------|-----------------|
| Ore milled, tons . . . . .         | 1,491,381       |
| Average value per ton . . . . \$   | 8.53            |
| Gross value . . . . .              | \$12,726,549.77 |
| Deduct loss in tailings . . . . \$ | 452,435.00      |
| Net value recovered . . . . .      | \$12,274,114.00 |

Nor was that all. The premium on United States Exchange brought \$167,901.65, and interest on investments and other income, \$382,591.83, so the total of income was \$12,824,608.25. The net profits from operations amounted to \$6,478,604.12. Taxes took \$518,223.67; depreciations and donations, \$813,690.18. This brought the net profit to \$5,146,690.27. From that \$3,198,000 was paid out in dividends, leaving \$1,948,690.27 to be added to surplus. The surplus then amounted to \$5,909,469.77, but the balance sheet shows net current assets of \$6,331,220.56, as follows:

## CURRENT

## Array of Liquid Assets

|                                                                                                                                          |    |              |
|------------------------------------------------------------------------------------------------------------------------------------------|----|--------------|
| Accounts Receivable . . . . .                                                                                                            | \$ | 31,819.28    |
| Accrued Interest on Victory Loan, etc . . . . .                                                                                          |    | 46,356.09    |
| Call Loans . . . . .                                                                                                                     |    | 703,479.90   |
| Charges paid in advance, Fire Insurance . . . . .                                                                                        |    | 6,180.30     |
| Guarantee Deposits . . . . .                                                                                                             |    | 300.00       |
| Material and Supplies on hand . . . . .                                                                                                  |    | 636,887.66   |
| City of Toronto 6% Bonds, 1940 (par \$110,000.00) . . . . .                                                                              |    | 115,808.00   |
| City of Winnipeg 4½% Consolidated Registered Stock, 1943-63 (par \$93,683.32) . . . . .                                                  |    | 70,465.84    |
| Town of Timmins Debentures . . . . .                                                                                                     |    | 84,543.47    |
| Dominion of Canada Victory Loan, 1924 (par \$ 89,000.00) . . . . .                                                                       |    | 86,796.78    |
| " " " " 1927 (par 250,000.00) . . . . .                                                                                                  |    | 250,000.00   |
| " " " " 1932 (par 50,000.00) . . . . .                                                                                                   |    | 49,546.25    |
| " " " " 1933 (par 1,940,000.00) . . . . .                                                                                                |    | 1,943,281.25 |
| " " " " 1934 (par 390,000.00) . . . . .                                                                                                  |    | 390,552.50   |
| " " " " 1937 (par 675,000.00) . . . . .                                                                                                  |    | 684,093.75   |
| Province of Ontario 6% Bonds, 1935 (par 100,000.00) . . . . .                                                                            |    | 93,000.00    |
| " " " " 6% " 1941 (par 50,000.00) . . . . .                                                                                              |    | 48,895.00    |
| Hydro Electric Power Commission of Ontario 4½% Bonds, 1960, guaranteed by the Province of Ontario (par \$129,000.00) . . . . .           |    | 106,425.00   |
| Hydro Electric Power Commission of Ontario 6% Bonds, 1941, guaranteed by the Province of Ontario (par \$25,000.00) . . . . .             |    | 25,593.75    |
| Daysland Drainage District Bonds, 6% Bonds, 1951, guaranteed by the Province of Alberta (par \$225,000.00) . . . . .                     |    | 225,900.00   |
| Lethbridge Northern Irrigation District 6% Bonds, 1951, guaranteed by the Province of Alberta (par \$375,000.00) . . . . .               |    | 375,000.00   |
| Province of Alberta 6% Bonds, 1941, (par \$75,000.00) . . . . .                                                                          |    | 76,031.25    |
| Province of British Columbia 6% Bonds, 1941, (par \$200,000) . . . . .                                                                   |    | 200,250.00   |
| " " " " 6% " 1946, (par 25,000) . . . . .                                                                                                |    | 25,406.25    |
| Canadian Northern Pacific Railway 4½% Debenture Stock, 1950, guaranteed by the Province of British Columbia, (par \$97,333.33) . . . . . |    | 77,019.86    |
| Canadian Northern Pacific Railway 4% Debenture Stock, 1950, guaranteed by the Province of British Columbia, (par \$97,333.33) . . . . .  |    | 70,420.66    |
| Province of Saskatchewan 4% Registered Stock, 1951, (par \$16,060.00) . . . . .                                                          |    | 11,181.47    |
| Province of Saskatchewan 4½% Registered Stock, 1954, (par \$14,600.00) . . . . .                                                         |    | 11,271.20    |
| Cash on Hand—in Bank . . . . .                                                                                                           |    | 929,757.05   |
|                                                                                                                                          |    | 7,376,262.62 |

## BULLION

|                                                   |    |                |
|---------------------------------------------------|----|----------------|
| Bullion in Transit (not paid for) . . . . .       | \$ | 455,053.47     |
| Solutions on Hand . . . . .                       |    | 102,513.65     |
| Litharge, Slags, Miscellaneous, on hand . . . . . |    | 2,150.00       |
| Total . . . . .                                   |    | \$7,935,979.74 |

operating difficulties, yet the ore reserves are higher than ever.

## The Year's Operating Results

At the end of 1921, the total of the reserves was 4,392,917 tons, estimated at \$42,716,027. On December 31st last the reserves were placed at 4,608,223 tons valued at \$43,269,827, the average of the mines being \$9.39 per ton, this notwithstanding the 1922 results, as follows:

Against this there were current liabilities of \$1,604,759.18, on account of wages and bills payable, \$888,750 for balance of purchase of Schumacher Gold Mines, and \$300,000 for Dominion Taxes for 1922. It is characteristically conservative to have an item of \$787,999.95 for depreciation on a plant that has cost \$5,253,333.01, on which \$3,615,954.42 has been written off, and the present valuation of which now stands at \$1,637,378.59, although \$1,070,076.25 was expended

upon it in 1922. Interest on investments' and other income amounting to \$382,591.83 may be said to be contributing 11.9 per cent. of the current annual dividend.

#### On a Manufacturing Basis

Liquid assets of \$7,935,979.74, the maintenance of a surplus that is more than ample for all contingencies, together with the gross value of the proved and approximated ore reserves, lend emphasis to these statements of President Noah A. Timmins:

"As stated last year, until there is a satisfactory solution of the power situation, upon which the whole programme of the contemplated extensions at the Mine depends, the Directors feel that any increase in the dividend must necessarily remain in abeyance, but shareholders may be assured that the matter will receive the earliest consideration of the Directors when the power situation has been cleared and the very large financial obligations provided for.

"At the risk of repetition we must again remind shareholders that the dividends they receive from a Mining Company should be treated, to at least fifty per cent thereof, as a return of Capital, because every dividend paid represents so much ore taken from the Mine which there is no means of replacing. It is again gratifying to report a substantial increase in the number of our shareholders who now number approximately 5,000 as against 3,500 at this time last year.

"The increased taxation imposed upon the Company's operations is a matter of grave concern to your Directors. The Hollinger Company has grown out of the speculative stage and is now established as a manufacturing industry and it would be well for the shareholders to realize that in addition to the large item in the Profit and Loss statement paid as direct taxation for the current year, the industry is further burdened by indirect taxation, amounting in all to considerably more than the direct taxation. The greater part of our mining supplies is subject to a tariff duty of 27½% which must be paid either through the Customs or to the sellers of similar articles in Canada by way of an addition to the price of the article purchased, on top of all of which there is a large sales tax, and this, in the case of an industry which should, in the interests of the public, be absolutely free from any direct or indirect taxation."

#### The Sole Deterrent

The power difficulty is the solitary deterrent. Were it not for this the company would have been free to proceed with a demonstration that will be of national importance and international interest. General Manager Brigham explained the position and policy to be followed, when he inserted this in his general comment:

"Further annoying power shortages have occurred during the year, which very materially affected the tonnage and costs.

"The regular annual occurrence of this embarrassing situation demonstrates that this Company will have to look to some other source of supply in order to complete the plans of the Hollinger, to bring the mine and plant to its highest economic development and efficiency.

"As is well known, the veins in the Porcupine district do not have sharply defined walls and

the ore often extends into the country rock with gradually decreasing values.

"To mill the lowest payable grade of ore it will be necessary to work the whole plant on a larger scale, for the reason that if this low grade portion of ore from the walls of the stopes is ever to be mined, it must be taken while the operations are in progress."

#### Rate of Money-Making

It becomes important in the national economies to note that the average daily crushing was 4,097 tons, regardless of power interruptions. As the total crushed in the year was 1,491,381 tons, some idea may be framed as to the rate of Hollinger money-making. Taking 350 days as a basis for calculation, at the stated daily crushing that would total 1,433,400 tons. Dividing by 350 the gross recovery of \$12,274,114.77, makes it clear that the daily contribution of wealth was \$35,069, or thereabout — \$1.461 an hour. While doing that the ore reserves were increased from 4,392,917 tons estimated at \$42,716,027, to 4,608,223 tons estimated at \$43,269,827, the average of the mine being \$9.39 per ton, compared with \$9.72 at the end of 1921. Of the tonnage milled in 1922, 465,928 tons came from above the 425-ft. level, and only 33,926 tons from below the 800-ft. levels, where, Mr. Brigham states, "the development has been highly favorable, particularly on levels 950, 1100, and 1250". Discovery of 97 vein on the 425-ft. level, and its development for several hundred feet, with an average value of \$30.82, was a remunerative incident in mines that have been producing for twelve years and still have 1,216,027 tons valued at \$12,990,707 above the 425-ft. level; 1,496,939 tons valued at \$16,074,718 between the 425 and 800-ft. levels, and which take credit for 677,779 tons worth \$6,672,448, below the 800-ft. Moreover, surface outcrops estimated at 209,681 tons worth \$2,183,360, have to be added to the \$12,990,707 known to exist above the 425-ft., without dwelling upon a portion of the 1,007,797 tons worth \$5,348,594 in veins of \$6 grade. This latter ore is not going to be a negligible factor, once the mill is enlarged and power is available. The management is proceeding to place the mines in a position where it will treat the lowest grade consistent with due economies. The greater the tonnage milled, the lower the cost should be, automatically. In 1922 the operating cost per ton milled, was \$4.2551. In 1921, the cost was \$4.8698. Taking this betterment as an index to what should follow when 7,000 tons or so is going through, it is deserving of notice that the 1922 yield and grade were equally noteworthy. In the 1922 gross value and average grade as given, the exchange premium on bullion is not included, as it was in 1921. Mr. Brigham explains that, in reality the added exchange in 1921 increased the actual yield of \$8.74 by 93c., hence the average grade appeared as \$9.67, whereas the \$167,901.65 realized from the premium in 1922, represented only 11¼c. The difference between the 1921 and 1922 recoveries was 21c, due to the exchange premium being only nominal of late. The difference in operating costs in favor of 1922 is a compensating factor.

#### Awaiting the Chance and Preparing for it

President Timmins took the opportunity, on behalf of the Board, to detail the efforts to obtain power, wherever it was to be had. They applied for the Long Sault Rapids on the Abitibi River. It was refused to the company because verbal application had been made for that power by the Abitibi Power & Paper Com-



pany. The Hollinger Company then applied for the water power at Island Portage, approximately 76½ miles away. A draft lease of this is about to be signed. Then there will be a forward movement. To this end, expenditures upon plant in 1922, were:

|                          | Buildings    | Equipment    | Total          |
|--------------------------|--------------|--------------|----------------|
| Central Shaft Plant      | \$ 8,192.46  | \$ 59,424.61 | \$ 117,526.47  |
| Compressor Plant . . .   |              | 25,008.55    | 25,008.55      |
| No. 11 Shaft Plant . . . | 21,424.63    | 9,661.19     | 32,185.82      |
| Mill & Conveyer Plant    | 35,927.31    | 135,380.71   | 191,308.02     |
| Mine Equipment . . .     |              | 12,824.17    | 12,824.17      |
| Waste Mill               |              | 109,763.99   | 109,763.99     |
| No. 1 Sub Station . . .  |              | 8,673.96     | 8,673.96       |
| New Headframe            | 259,795.74   |              | 259,795.74     |
| New Hospital             | 2,173.35     | 135.00       | 2,308.35       |
| New Store Building . .   | 5,963.14     | 4,270.43     | 10,233.57      |
| Cable Cars               | 6,990.70     | 199.95       | 7,190.65       |
| Maintenance              | 911.30       | 5,710.43     | 6,621.73       |
| Schumacher Gold Mines    |              |              |                |
| Transport                | 98,921.31    | 189,213.92   | 288,135.23     |
|                          | \$511,309.94 | \$560,266.31 | \$1,071,576.25 |
| Cash for Above Exp. Loss | 500.00       | 1,000.00     | 1,500.00       |
|                          | \$510,809.94 | \$559,266.31 | \$1,070,076.25 |

#### Cost of the Schumacher

The Schumacher purchase is carried at cost: \$1,343,541, the balance due being \$888,750. While surface equipment has been provided for the Schumacher, there are no estimates as to its mining position, further than that President Timmins states the veins of the Acme property of Hollinger have a distinct tendency to dip to the east and pass into the Schumacher territory at depths between 2,000 and 2,500 feet. It will be some time before that depth is reached if the Acme section keeps on growing.

\* \* \*

#### LONDON ENTHUSES OVER PORTLAND CANAL

It is a mistake to suppose the World Metropolis is phlegmatic or moving slowly, like all great bodies. London is no different from its contemporaries when it runs across something that will induce "pep." The ordinary event is the merest pebble dropped into an ocean of people, who may seem unruffled, but who, in their own way, are far removed from fridity.

It is the hardest and easiest place to convince; yet when London is going, the going is good, and the latest proof of this is the avidity with which Throgmorton street and its environs entered into the market for Selukwe company shares, following upon the report that the extension of the Premier Gold Company's ore zone had been intersected by the British Canadian Silver Corporation, operating in the Portland Canal district of British Columbia, holding properties and interests in properties surrounding the Premier and adjacent to Indian Mines, the latter controlled by Montreal and Toronto.

No sooner did the cables announce the cutting of what was believed to be the Premier section, than Selukwe shares took three octaves at a jump—soared from a five shillings register to twenty-seven and sixpence. The incident prompted London to consult the maps and start the machinery. The oversea speculator is gregarious. Portland Canal at last appealed to him, and here are the reasons for it, as set forth by the Financial and Mining Editor of "The African World", which specializes in all things African:

#### The Selukwe's Promising Venture

In 1919 the Selukwe Company acquired certain options over a proportion of the share capitals of

three Canadian mining companies, which options it transferred to a subsidiary company, known as the British Canadian Silver Corporation, Ltd. This company has a capital of £400,000, in 5s. shares, the whole of the issued capital being held by the Selukwe Company. The options concerned the B. C. Silver Mines, Ltd., the Bush Mines, Ltd., and the Salmon Bear River Mining Company, Ltd., all incorporated in Canada, and owning properties in the Salmon River district of British Columbia. The subsidiary of the Selukwe now holds 40 per cent. of the capital of the B. C. Silver Mines, a small interest in the Bush Mines, as well as an interest in the National Mines. It also holds as its own property the claims known as the Cascade, which may prove to be of considerable future importance in the working of the B. C. Silver Mines. In between the claims of the B. C. Silver Mines is sandwiched the property of the Premier Gold Mining Company, an American concern with a capital of \$5,000,000 in \$1 shares, which are at present valued on the New York Stock Exchange in the neighbourhood of \$50 per share. Of its capital the Premier only received about \$260,000 in cash for working capital. It distributed last year to its shareholders dividends totalling \$2,700,000, which, with a dividend paid the previous year, brings up the total distribution to \$3,150,000. The Premier Mine appears to possess three lodes, of which, however, one lode is contributing the bulk of the ore possessing high values in gold and silver. This lode should be found to run through the northern claims of the B. C. Silver Mines, and may have been cut, for a cable published on January 18 reads as follows:—"Have crosscut lode 25 ft.; we have so far not met with the footwall. The quartz is well charged with pyrites galena. Assays vary up to \$25. Premier Gold Mining Company have ore bodies of the type. Fully expect developments on the lode to get rich ore same as Premier Gold Mining Company, Ltd. Work proceeding steadily; will duly advise you by cable as regards important developments."

#### District and History

Salmon River district lies in Northern British Columbia, about eleven miles north of Stewart, which is situated at the head of the Portland Canal, one of the largest fiords which penetrate the coast range. On the west the district adjoins the boundary between Alaska and British Columbia. The eastern boundary is formed by Bear River ridge, which trends almost north and south. The map area is triangular, and about sixty square miles in area. The district contains the headwaters of the Salmon River, which flows southward into Portland Canal at Hyder, Alaska. It is accessible by a wagon road and trail from Stewart up Salmon River, Stewart being reached by steamship service from Prince Rupert and Vancouver. The district first came into prominence about 1910 on some very promising discoveries, which, however, did not materialise, and interest in the camp remained dormant until a couple of years ago, when a Canadian named R. K. Neill made a careful examination of the district and the old workings, and came to the conclusion that exploratory operations had been



conducted parallel to instead of across the formation. His judgment was confirmed when he cross-cut a few feet in one of the tunnels, and came across a big ore body showing high values. The property — now the Premier — was promptly secured by big New York interests, including the Guggenheims. The general trend of the formation is north-east, and there is a strong body of ore outcropping along the ridge on which the B. C. Silver claims are located, which appears to indicate the continuity of the formation, although owing to climatic and other conditions most of the value in the outcrop has been washed out, high values only commencing at about 200 ft. from the surface. The mines are worked by adits, so that there is no expense in hoisting or pumping. The B. C. Silver Company is cutting a tunnel across the run of the Premier lode, where it should come into its property, the horizon being equivalent to the second level of the Premier Mine, with the results already mentioned. The Cascade claims, belonging to the subsidiary of the Selukwe, will, outside any direct mineral value, allow of tunnels being driven into the hill-side practically down to the water level, and prevent the crowding out which might conceivably have resulted by the buying up by others of the surrounding properties. It is too early yet to express any definite opinion as to the continuity of the rich values into the B. C. Silver claims of the extraordinary high values of the Premier although the outlook for doing so is distinctly promising. On the southern block of claims belonging to the B. C. Silver a parallel lode has been located, while it is probable that a third lode located on the Premier, to the west of the main lode, will also be found in the northern block of B. C. Silver claims, a formation having been struck by a borehole. There appears to be every indication that the Selukwe has secured an extremely promising asset in its British Columbia interests, and further particulars respecting developments will be awaited with interest.

#### Overstatements Not Justified

This is the London story. It confirms the Selukwe find. Evidently the Premier, Selukwe and Indian Mines have neighboring extensive areas, owned outright or on joint account with others. The values quoted in the cable resemble those of the Indian more than those of the Premier, but if the width is maintained London enthusiasm should result in more capital going to that locality.

It is rather overdrawing it, however, to claim that "the Premier only received \$260,000 in cash." Working capital exceeded that, for an aerial tramway had to be constructed, roads made, a mill built and development prosecuted. While it is a fact that the Premier company made a "total distribution of \$3,150,000," it is stretching it to state that the \$1 Premier shares "are at present valued on the New York Stock Exchange in the neighborhood of \$50 per share." That would make the market valuation of the Premier capital issue, \$250,000,000. Really the shares occasionally are being dealt in at about \$4 (between \$3 and \$4) on the Curb, not the Stock Exchange.

Conceding the auspicious outlook confronting the Selukwe, because of its interests in and about the Premier, and according to Portland Canal a large measure

of commendation, the facts carry with them an admonition that London should take "well enough" at its worth. The author of "The African World" comment is scrupulously circumspect as a rule. His informants might be given to understand that exaggeration arouses incredulity and invites discredit, which all interested in Portland Canal desire to avoid, since the prospects are sufficiently flattering without any fanciful additions.

### LETTERS FROM READERS

#### Geological Maps Wanted

To the Editor,

Canadian Mining Journal.

Sir:

The territory through which the Canadian National Railway runs, between Sudbury and Port Arthur, needs prospectors and needs them bad. Suggestions have been made from time to time in order to attract prospectors into this promising territory, but without success. It is getting to be a well recognized fact that the Ontario Dept. of Mines through their geological reports, maps and prospectors' classes have developed a group of prospectors who are giving a good account of themselves. Years ago the Old Timer rambled, hit and miss fashion; but we must give him credit for his initiative. Geologists, geological reports and maps meant little or nothing to him. He claimed he could see just as far into the ground as any other rock hound. But after Dr. Miller had declared himself quickly and correctly at Cobalt, and his assistants had done their efficient work up in the gold camps, the prospector began to sit up and take notice. Now, instead of rambling off on his own, he must have his geological map and reports, with which he has been well supplied along the T. & N. O. country, and that's one of the reasons why he can't be pried loose from that district. Yet you can't blame him; the proper order of prospecting exists along that line. The geologist goes *ahead* and maps the porphyry intrusions and the prospectors follow on his heels. Now, by starting in on these two promising belts of rock that cross at Mileage 81 and Ground Hog respectively on the Canadian National main line and working from the railroad in, and mapping in detail to show porphyry intrusions, then the modern prospector in these parts will be given some inducement and encouragement in his efforts that will benefit us all.

Gogoma, Ont.

Tom Saville.

#### OIL SHALE EXPERIMENT ABANDONED

The attempt to extract oil from shale in New South Wales by means of firing it in the ground and collecting the oil thus distilled, has been abandoned, according to an announcement by Mr. John Fell, who was conducting the enterprise. The high cost of Australian labour and the low price of imported oil are given by Mr. Fell as the principal reasons why these remarkably rich oil shales cannot be worked at a profit.

During the year 1922 Britain regained the whole of her former export markets for coal, lost during the war time. The importance of this can be gauged from the fact that it is principally by means of the export of coal that Britain pays for the food that must be imported. The natural product next in importance to coal as an export, but a poor second, is China clay, obtained from the famous pits in Cornwall, which is shipped to all quarters of the globe.



# The Mining Districts

BY THE JOURNAL'S CORRESPONDENTS

## NORTHERN ONTARIO

**POWER SHORTAGE.**—Porcupine mines have had notice of a seasonal power cut within a week, and they are now receiving only about one-half their normal power requirements. The shortfall came rather as a surprise, because for some time past it has been announced that the Sandy Falls plant would be delivering an additional 3000 h.p. in February. The water in the Mattagami river, however, appears to be exceptionally low, and it is believed that the power company is now down to the normal flow of the river. The Northern Canada Power Company announces that it will proceed this year with the development of Kenogamissi power, where it is anticipated that from 3000 to 5000 additional h.p. is available. This involves the diversion of the Grassy River into Kenogamissi Lake, and the estimated expenditure is approximately \$1,250,000. Construction work on the Sandy Falls plant is being rushed, and it is now hoped to have the first unit in commission in March with the second unit a month or so later. During the past few years there have been recurring power shortages, which the power company now hopes to overcome with the proposed development.

**HOLLINGER ANNUAL REPORT.**—The annual report of the Hollinger Mine for the year ending December 31st, 1922, shows that the company established new records of production and profits. During the year they treated a total of 1,491,381 tons, averaging \$8.53 a ton, as compared with \$8.74 for the preceding year. The total income for the year was \$12,824.08, an increase of \$2,500,000. Operating charges increased \$1,100,000, to \$6,346,000, and the net profit was \$5,146,690, an increase of \$1,100,000. Total dividends paid during the year amounted to \$3,198,000, the same as in 1921, leaving \$1,949,000 to be carried to surplus, which now stands at \$5,910,000. The assets are shown at \$32,000,000, and include \$1,343,000 for the Schumacher Mine, which was purchased during the year. Current assets in excess of liabilities amount to \$5,572,000, and ore reserves are estimated at 4,608,223 tons, averaging \$9.39 a ton, a total of \$43,270,000, which is practically the same as for the preceding year. The report makes special mention of the power shortage and states that had it not been for these that the total production and net profit would have been materially greater. The report also makes the definite statement that on account of the power troubles, in order to attain the production and efficiency desired, it will be necessary for the company to develop its own power, and that the question of increased dividends will remain in abeyance until this matter is settled. Developments under ground during the year were favorable, particularly on the 950-foot, 1100-foot and 1250-foot levels, where all veins so far exposed are of good values and widths, as compared with occurrences on the upper levels.

**PORCUPINE.**—Work on the West Dome Lake Consolidated has been stopped for the time being. The company made an attempt to unwater the mine with steam power, but this has not proved satisfactory and the directors have decided to await the spring freshets, when it is hoped that electric power will be available.

**KIRKLAND.**—It is stated that the Tonopah Mining Company of Nevada is investigating the Woods property in the Kirkland district, with a view to its acquisition.

The taking over of the Kirkland Lake Proprietary's interests in the Sylvanite property involved a larger sum than was originally mentioned. The total amount involved is now officially stated to be \$1,130,000, of which \$400,000 is to go into the Sylvanite treasury for the development of the property. The Kirkland Lake Proprietary owned 891,000 out of 3,000,000 shares of Sylvanite and will receive \$730,000 for these. This is believed to be the largest amount of cash ever paid for a gold mine in Northern Ontario. The purchasers are connected with the Wright Hargreaves property adjoining. The main shaft will be sunk to a greater depth and a considerable amount of development work will be done. With this large sum going to the Kirkland Lake Proprietary, that company will be in a position to pay off all its obligations and to develop thoroughly the Tough-Oakes and enable a greater tonnage of ore to be placed in sight.

Arrangements have been made to install a small mining plant on the Highland-Kirkland. It is understood that the plant will be installed immediately in order to take advantage of the winter roads. The property is being developed by Toronto and New Liskeard people.

**DANE.**—The excitement in connection with the new gold district of Rouyn Township in Northern Quebec is assuming the aspects of an old time rush. The country is rapidly being staked far outside the limits of the original discoveries, and with the recent completion of the winter road from Dane on the T. & N. O. Railway, it is now possible to bring in mining equipment and supplies. Several diamond drills will be operated, and it is anticipated that a great deal of work will be done during the coming spring and summer. Most of the staking is snow staking, and there has been as yet no opportunity to size up the possibilities of the country, outside the original discoveries. These, however, are very good, particularly on the Powell property, where the vein has been traced for over a mile in length and shows good values over substantial widths. The geological conditions are somewhat similar to Kirkland Lake, and old time prospectors state that the discoveries are the most important since Kirkland.

The milling plant at the Argonaut Mine is practically completed, and should soon be in operation. The process being used is somewhat different from that used in the mills of Northern Ontario in that flotation will first be used to eliminate the copper contents. The tailings from the flotation plant will be cyanided. Results on the 500-foot level are understood to be very satisfactory, the ore being of a very good grade.

The directors of the Keeley Mine announce the declaration of an 8 per cent. dividend, which calls for a disbursement of \$160,000. The headquarters of the company have recently been transferred to Canada and the assets turned over to a new company with a capital of \$2,000,000. Mr. J. Mackintosh Bell is consulting engineer and Mr. Hamilton B. Wills is president.



## NOVA SCOTIA

**LAWLESSNESS IN SYDNEY.**—Nova Scotia is just beginning to realize that in times of acute industrial strife, such as we have lately had at the Sydney steel works, the law is openly defied and flouted and mob rule in all its riotous vagaries governs. Neither life nor property is protected on such occasions, the rights of free citizenship are denied, courage to do what is right is deemed foolhardy, and the few men who dare to exercise that courage are held up to open scorn and ridicule. Mob intimidation, running all the way from blocking the principle roadways leading to work by hordes of howling, jostling pickets, forcibly holding up workmen, and vehicles of all kinds, to placing railway ties across the tracks, stopping trains, and searching these for "scab" labor, detaching locomotives from cars containing supplies for the steel plant, to openly parading with guns, is only part of the picture of the late steel strike. Then when the strike was declared off hundreds of men paraded to the premises of merchants who supplied the maintenance men trying to save the steel property for the use of these very strikers, entered the stores, called vile names, stormed and abused, and threatened the boycott to the ultimate strangling of business and the starvation of all connected with it. This disgraceful and lawless conduct, coming after the majority of the workmen had voted to go back to work pending an investigation in the result of which they had agreed to concur before it was made, shows how little the rank and file realize the humiliating position in which they have been placed before the public. The newspapers, public opinion and the majority of the workmen were all against the strike but were helpless in the hands of the minority, who were quick to gain control of the situation and hold it until they were willing to let it go. The investigation found the offending employee at fault and he was kept off the works, yet there is every evidence that more strife is being fomented and a repetition of the same revolutionary scenes may again be enacted.

The rabid "reds" claim that the strike was a howling success. They point out to their followers the gains made, which actually amounted to nothing, for their case was lost from the very beginning. But they succeeded in setting at naught all law, making a mockery of all constituted authority, and in riding rough-shod over everything that came in the way. Inflated with the feeling of false victory, there seems to be a determination to try their strength again, and if drastic and prompt action is not taken and law enforced, it is difficult to understand, how progress can be made or business stabilized and industry kept going. The workers are in the hands of the "reds", and while the majority of the workmen are not revolutionary at heart they are permitting themselves to be used for the destruction of the very industry by which they hope to live.

When the country awakes to the real danger hanging over the two large industries of Nova Scotia, they will make haste to save them. Unfortunately peaceful citizens have short memories and soon forget the unpleasant experiences of the past. The Cape Breton coal strike is not so far away as to be forgotten, and the same dominating, ruthless spirit of that crisis was again seen in Sydney last week, and may yet be aroused to more intensified bitterness and violence by the loud mouthings of irresponsible leaders.

If the right to go to work had been guaranteed to the steel workers, most of whom are honest and fair minded

men, we would not now be facing a doubtful and critical situation, for these men would have settled the question at issue and peace might have been with us for years to come. They were in the great majority then, and would not have been deterred by a minority mob element from the faithful performance of their duty. A recent statement of one of the leaders goes to show that trouble was created for the purpose of organizing the workmen as unionists. With organized labor, well led, we have no quarrel; but if men are duped into joining such an organization, who can say that the same tactics of falsehood will not be employed in running the union by the very men who planned the first deception?

**GOOD WORK ON NATIONAL RAILWAY LINES.**—The Canadian Government Railways do not often come in for much praise; indeed the custom has been to "knock" them; but those who know what has been accomplished in Nova Scotia this winter cannot withhold good words, much less criticism. The winter has been very severe, with long periods of hard frost. The lumbermen of Cumberland had to leave the woods early in January because of heavy snow. About the same time there were upwards of 30,000 tons of coal in cars between the railway yards of Truro and Springhill Junction, yet within the short period of a little over two weeks this coal with much other freight was carried to its destination and relief given to the districts short of coal. All this time the collieries of Pictou and Cumberland were kept running steadily.

**SELECTION OF RESCUE APPARATUS.**—A test of four different types of self-contained rescue apparatus is being made by the Dominion Coal Company to determine which they will select. The experiment is being conducted along scientific and practical lines. The men and machines are working in the same kind of atmosphere that would be found in a coal mine after there had been an explosion, and the work done is the same as that to be performed by rescue parties in times of mine disaster. In all twelve days will be consumed in making the test, four above and eight below ground. Both men and machines are put through an examination before and after the two hours test is made, and an analysis made by a chemist of the carbon dioxide left in the breathing bag. A full report will be published in the *Canadian Mining Journal* after the test is completed.

## BRITISH COLUMBIA

**PORTLAND CANAL.**—The definite proving of the extension of the ore body below the fourth level on the Premier Mine and the opening up of high grade ore of the same character on the adjacent property of the B. C. Silver Mines Ltd. are two recent important developments in the Portland Canal camp, north of the town of Stewart.

G. D. B. Turner, vice-president and general manager of the Indian Mines Ltd., states that the whole atmosphere in this section has changed in a month. Confidence in the permanence of the camp has taken the place of doubt and large prices are being asked for prospects which may become valuable but have not been proved. Eight properties have been working throughout the winter, Mr. Turner reports, and two or three will be shipping ore before the snow goes. The Indian has been under development without interruption, a considerable body of milling ore has been located,



and the management feel that they have every chance of finding the richer ores.

Only a few weeks ago Mr. Turner inspected the Premier, B. C. Silver and Mobile as well as the Indian Mines. As he is a conservative as well as a thoroughly experienced engineer, it is worth while quoting his impressions:

"For a time it was very questionable how far the ore bodies of the Premier would be below a certain horizon and so it was feared that some values might give out below No. 4 tunnel. Not only are the ore bodies continuing in the fissures but some new ore bodies have been discovered. This, coupled with the new strike made on the B. C. Silver, has added great confidence. The Indian Mine, lying further to the northwest, was perhaps the most actively worked mine during 1922, apart from the Premier. The Indian has employed 17 men since last April. While high-grade ore in quantity has not yet been found, large bodies of good commercial ore already have been disclosed, the ore of which is not quite blocked out. There has been sufficient in sight to satisfy me that a milling plant will be required for the property by next autumn. McCuaig Brothers, of Montreal, are showing a very active interest and are lending their support to the Indian Mine. In the early days these men were connected with such British Columbia properties as the Payne, War Eagle, Le Roi, and North Star."

C. A. Banks, managing director of the Canadian Silver Corporation, Ltd., controlling the B. C. Silver and other properties in the Salmon River section of Portland Canal, when interviewed in Vancouver stated that the crosscut tunnel on the B. C. Silver has been driven 1050 feet and that it has cut the eastern extension of the Premier Mine vein. He says that the enclosing rocks and the gangue of the vein itself are identical with that of the Premier. The vein, which has been crosscut twenty five feet, consists of low-grade ore as far as driven. The footwall has not been reached. The results of development have been decidedly encouraging and it is hoped that a shoot of the high-grade will be uncovered on the footwall or by drifting as in the Premier.

OMINECA AND CARIBOO.—Discussing the northeast sections of British Columbia before the B. C. Chamber of Mines, J. D. Galloway, resident mining engineer, said that J. T. Duthie's two properties on Hudson Bay Mountain, near the town of Smithers, were promising. One carries good gold values and a considerable zinc content while the other is a high-grade silver-lead property. The presence of freibergite and ruby silver makes this ore very rich in silver and the lowest tunnel on the vein is showing up phenomenal ore. Steady shipments of ore have been made. A gold prospect in the Babine Range east of Smithers is being opened up by a New York company and with a small expenditure a very large ore-body has been exposed on the surface. Engineers are now on the ground arranging for the equipment of the property with machinery for deep development.

As to the Cariboo, he predicted a great revival of activity. Many companies were engaged in testing by means of Keystone drilling and other methods the district's low grade placer gravels. Lack of water made the 1922 season a poor one for hydraulic work but notwithstanding the gold production was nearly three times what it was in 1921.

The Cedar Creek discovery east of the town of Quesnel Forks was important as a source of gold and as an in-

dicator of a new type of placer deposit, which would cause a re-prospecting of the whole of the Cariboo. The gold bearing gravels in this camp are portions or remnants of a very old high level Tertiary channel. They are characterized by extremely rich ground, running from \$25 to \$500 a cubic yard. Rich ground has been found on three leases and many leases in the vicinity of the discovery warrant thorough prospecting to find possible continuations of the gold bearing channel. A production of \$125,000 had been made by the camp last year, principally by means of rockers, a very primitive and small scale form of mining. With more improved mining methods a much larger production will be made in 1923.

NEW MILL FOR ANYOX.—H. S. Munroe, general manager of the Granby Consolidated Mining & Smelting Co., is definitely quoted as stating that the proposed new concentrating mill at Anyox, the Company's smelting centre, will be constructed, that it will cost approximately \$500,000, and that it will be ready for operation early in 1924. Work will start this spring and the mill will have a capacity of between 1200 and 1500 tons of ore a day. Several millions of tons of ore, which it is not economical to treat by smelting direct, are reported to be blocked out and ready for mining as soon as the additional plant is in shape to handle it. With the advent of the mill it is expected that one furnace of the smelter will be closed down.

Further descriptive details of the concentrator are as follows: Its site will be on the side-hill overlooking the water and below the present "high line" railway track. The ore will first be crushed by large crushers now in place at the mine and thence transported over the "high line" railway. A fine crushing plant will reduce it further and conveyors then will transport the material to storage bins at the head of the mill. Oil flotation will be used, the plant consisting of a crusher building, conveyor system, concentrator building, de-watering tanks and filter building. The plant will be designed for an ultimate capacity of 3,000 tons of ore a day, in three units of 1000 tons nominal capacity each. Construction work on the first unit will start as soon as plans can be drawn and material assembled. In order to handle the concentrate certain changes will be made in the smelter, which may include the erection of a new sintering plant. Machine shops, electric shop, and foundry will be altered or enlarged in order to provide more efficiently for the construction work in view.

The Outsider Mine, Portland Canal, which the Company controls, is expected to be shipping ore to Anyox towards the close of the year.

GRANBY PLANS.—The plans of the Granby company, when carried to fruition, will enormously increase the scope of its operations in British Columbia. Recent construction, together with that projected, in connection with the Anyox plant involve an expenditure of about \$1,200,000. This figure is obtained by adding the estimated cost of the new Mill, \$500,000, to that of the lately undertaken and now almost complete storage dam, which runs to nearly half a million, and that of an addition to the hydro-electric plant at No. 1 Power House, which approximates \$200,000. These works seem to assure the permanence of Anyox as a mining centre and would appear to indicate confidence, not only in the Hidden Creek Mine, but in the possibilities of such other properties as the Outsider, now being developed, and prospects in the Portland Canal region in which the Company is reported to be interested.



Attention, however, has lately been focused on the Granby Co. more on account of the acquisition of the mine and mill of the Canada Copper Co. at Copper Mountain than for any other reason. It is understood that the concentrate from this mill will be treated by the Consolidated Mining and Smelting Company at Trail as soon as the copper smelter there is re-opened.

**THE IRON ORE SURVEY.**—The survey of the iron ore deposits of British Columbia, which was started by Dr. G. A. Young, of the Canadian Geological Survey last year, will be resumed as soon as the season opens. Dr. Young, who is in Ottawa, is making preparations already to take up the work where it was left off last year. At the last session of the British Columbia legislature the expenditure of the sum of \$50,000 was authorized to permit the obtaining of information that Dr. Young must have to make an authoritative report on the tonnage of suitable iron ore available for the maintenance of an iron industry. Detailed plans have not yet been formulated but it is expected that some properties will be diamond drilled and other exploratory work done this summer upon Dr. Young's recommendation and under his supervision. Hon. Wm. Sloan, the Minister of Mines for the Province, states that every possible assistance will be given the investigator in order that the facts as to provincial iron ore resources may be authentically established.

Meanwhile it is reported that a syndicate of Spokane business men is taking an interest in the iron ores of the interior of British Columbia with a view to their development. Fred Starkey, commissioner for the Associated Boards of Trade of Eastern B. C., is compiling all information available regarding these deposits for the use of this syndicate.

**TRAIL ORE RECEIPTS.**—Ore receipts at the Trail Smelter, Consolidated Mining & Smelting Co. of Canada, for the first week in February totalled 9264 tons, bringing the aggregate for the year to 45,242 tons. The fact that the custom ore receipts for the year already amount to 5246 tons indicates that there is much greater activity generally in the mining industry of British Columbia's Kootenay and Boundary camps. The shipments to the smelter from the 1st to the 7th of February follow:—

|                                 |         |
|---------------------------------|---------|
| Black Rock, Northport . . . . . | 42 tons |
| Bosun, Silverton . . . . .      | 32 "    |
| Company Mines . . . . .         | 8306 "  |
| Knob Hill, Republic . . . . .   | 209 "   |
| Lone Pine, Republic . . . . .   | 257 "   |
| Paradise, Invermere . . . . .   | 84 "    |
| Quilp, Republic . . . . .       | 56 "    |
| Silversmith, Sandon . . . . .   | 133 "   |
| Surprise, Republic . . . . .    | 145 "   |

Total . . . . . 9264 "

**CLINTON.**—The Whitewater area, Clinton district, is being much discussed at present. Here E. J. Taylor, a prospector, made a find two years ago which he has bonded to G. A. Crane and associates for \$300,000. Since then there has been much prospecting and some 500 claims have been recorded. This sounds as though the ground had been well covered but, if returned miners are to be taken literally, the possibilities of the district are far from exhausted. Mr. Crane, an English engineer, who has been into the Whitewater valley, seems impressed and is giving his personal attention to the opening up of the Taylor property. C. A. Baldwin and the Gibson brothers, experienced miners, have acquired a number of claims. They located the Motherode and Amazon groups on Motherlode and Orofino mountains, samples of whose ores are said to have given

returns of \$2400 to the ton. They are reported to have bonded these properties for \$550,000. The Spokane group on MacClure Creek is said to have been bonded for \$200,000. R. W. Wood and A. B. Triles, whose names are well-known as among those early associated with the Premier Mine, are interested in some Whitewater prospects. Major A. W. Davis, resilient mining engineer, recently said that this district gave excellent promise, that several of the groups of claims bonded would be opened up this year, and that there was an immense virgin territory lying to the west of the Whitewater between Chilco Lake, Bute, Toba, and Jervis Inlets.

**PIONEER DEAD.**—One of the pioneer mine operators of British Columbia died recently in the person of Captain F. P. Armstrong, who about thirty years ago operated the Ruth Mine at the head of Vermont Creek in the Golden mining division. Later he worked the Giant Mine, a low-grade lead property, in conjunction with Thomas Jones, the discoverer of the Paradise Mine. Ore from both properties was shipped up the Columbia river to Golden and thence transported by rail to the smelter.

Representations are being made by the Associated Boards of Trade of British Columbia to the Dominion Government in favor of the immediate establishment in the Kootenays of an Ore Testing Plant.

The Granite-Poorman Mine at Granite is reported to have been bonded by Alfred F. Jerome and Associates whose intention it is to start work there immediately.

D. J. Williams, formerly manager for the Rocher de Poile Copper Company, has been appointed manager of the Drum Lummon Mine, Douglas Channel.

Ronald McKinnon, a recent arrival at Edmonton Alberta from Fort Norman, states that the oil tanks at the Fort Norman well are full and that no drilling has been done since the freeze-up. A crew is on the ground ready to resume operations as soon as weather permits.

**THE CUMBERLAND EXPLOSION.**—Officials of the Canadian Collieries (D) Ltd. and employees of the company held a meeting on Thursday, the 15th February, when the latter demanded that before No. 4 Mine, Cumberland, where 33 men recently lost their lives as a result of an explosion, was re-opened the long-wall system of mining be abandoned in favor of the pillar and stall method and that all underground Oriental workers be expelled.

The management's reply was that Chinamen could not be done away with until the changes incident to the abolition of the long-wall workings were complete. To that change there was no objection. When this had been accomplished Orientals would no longer be employed in the mine.

A standing vote indicated that on this understanding the men were willing to return to work and doubtless in the course of a few days that part of No. 4 Mine which was not affected by the disaster again will be on a producing basis.

On Friday the 16th an Inquest was held into the cause of the Explosion and the Coroner's Jury rendered the following verdict: "We, the undersigned jury, empannelled to inquire into the death of William Whitehouse and thirty two others, find from the evidence given that these men met their death by an explosion of gas on February 8th about 7.15 p.m. in No. 2 east level, No. 4 slope, 15 west off No. 1 slope, No. 4 mine Cumberland. Cause of explosion unknown." The result of the special official investigation into the disaster is not yet known.

**COAL MINE TO BE ABANDONED.**—The Western Fuel Corporation of Canada, a limited liability company, has been closed down and, it is understood, will be



pletely abandoned. This property is about three miles from the city of Nanaimo. It was opened some forty years ago and its initial operation was unique by reason of the fact that transportation was over an aerial tramway from the mine to Nanaimo Harbour, one of the rare instances of the use of such a tramway in connection with colliery work in Canada. Over a considerable period it was shut down and was developed a second time by the New Vancouver Coal Co., which since has passed out of existence. Once more its workings were deserted until the year 1916 when the Western Fuel Company took hold and so pushed work that the Herewood became during the war a considerable producer. It was at this time that it reached its peak in point of output, an average of 1,000 tons a day being mined and brought to the surface. In recent months the production has been steadily declining until finally it ran to only a few hundred tons a day. The Company evidently has concluded now that the economic life of the mine is at an end. The main haulage way of the mine was a little over a mile in length. Thus another of the well-known Vancouver Island coal mines passes into history.

**COLLIERY OUTPUT FOR JANUARY.**—The coal output of British Columbia for the month of January was 271,065 tons. Notwithstanding the competition of fuel oil and the practical prohibition of export to the United States because of the 53 cents a ton duty imposed by the Fordney tariff, the industry is holding its own. This only emphasises the possibilities were these handicaps to be removed.

To find the production of the Crow's Nest Pass collieries maintained at normal is both surprising and gratifying. There is no doubt that this field is hard hit by the two causes mentioned and yet the Coal Creek mines have not lost a day this year. Fernie coal is still being sold to the Great Northern Ry. and its popularity as a domestic fuel in the homes of the prairies is said to be increasing. Coke from the Michel ovens is being supplied to the Trail Smelter. That the industry is able to flourish in spite of adverse tariff and of stiff competition speaks well both of the quality of the coal and of the efficiency of the management.

At the Granby Collieries, Cassidy, where the management has been troubled with "blow outs", the January production totals 24,615 tons, the highest from any single island coal mine, with the possible exception of No. 1, Western Fuel Corporation. The Cumberland Mines of the Canadian Collieries (D) had an output of 23,180 tons during the month, the greater part of which, no doubt, came from No. 4 Mine where the recent explosion with heavy loss of life took place.

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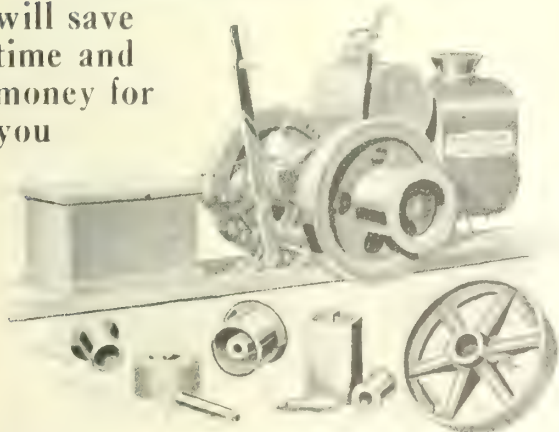
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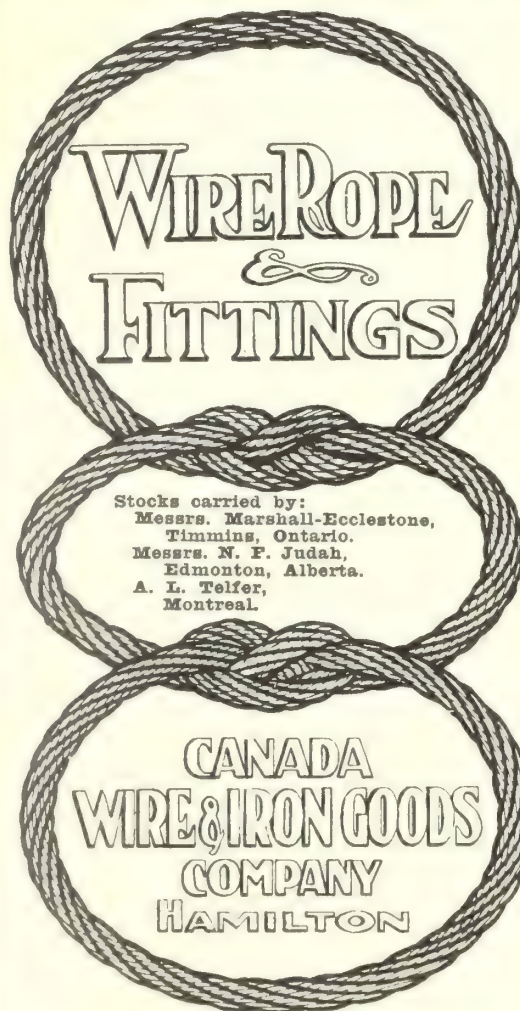
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## INDEX TO MINE AND MILL SUPPLIES

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**Acetylene Gas:**  
Pres-O-Lite Co. of Canada, Ltd.

**Agitators:**  
The Dorr Co.  
Horton Steel Works, Limited.

**Air Compressors:**  
Belliss & Morcom Ltd.  
Canadian Ingersoll-Rand Co., Ltd.  
Denver Rock Drill Mfg. Co., Ltd.  
Herbert, Alfred, Limited  
Holman Bros., Ltd.  
Laurie & Lamb.  
Sullivan Machinery.

**Air Hoists:**  
Canadian Ingersoll-Rand Co. Ltd.  
Denver Rock Drill Mfg. Co.  
Herbert, Alfred, Limited.  
Holman Bros., Ltd.

**Air Receivers:**  
Canadian Ingersoll-Rand Co., Ltd.

**Alloy & Carbon Tool Steel:**  
Peacock Bros., Ltd.

**Amalgamators:**  
Mine & Smelter Supply Co.

**Asbestos:**  
Everitt & Co.

**Ash Handling Machinery:**  
Canadian Link-Belt Co., Ltd.  
Canadian Mead-Morrison Co.

**Assayers and Chemists:**  
Ledoux & Co.  
Thos. Heyes & Son.

**Assayer's and Chemists' Supplies:**  
Lyman, Limited.  
Mine & Smelter Supply Co.

### Balls:

Hebert, Alfred, Limited  
Holman Bros., Ltd.  
Hull Iron & Steel Foundries, Ltd.  
Peacock Brothers, Limited.  
The William Kennedy & Sons, Ltd.

### Ball Mills:

Herbert, Alfred, Limited.  
Holman Bros., Ltd.  
Hull Iron & Steel Foundries, Ltd.  
Mine & Smelter Supply.

### Ball Mill Feeders:

Herbert, Alfred, Limited.  
Holman Bros., Ltd.  
Hull Iron & Smelter Supply.  
Mine & Smelter Supply.

### Ball Mill Linings:

Canadian Steel Foundries, Ltd.  
The William Kennedy & Sons, Ltd.  
Peacock Bros., Ltd.  
Hull Iron & Steel Foundries, Ltd.  
Mine & Smelter Supply.

**Balances — Assay & Analytical:**  
Mine & Smelter Supply.

**Beltting — Leather, Rubber & Cotton:**  
Canadian Link-Belt Co., Ltd.  
Jones & Glassco (Regd.).

**Beltting:**  
Gutta Percha & Rubber, Ltd.

**Beltting — Silent Chain:**  
Canadian Link-Belt Co., Ltd.  
Hans Renold of Canada, Ltd.  
Jones & Glassco (Regd.)

**Beltting (Conveyor):**  
Gutta Percha & Rubber, Ltd.  
Dunlop Tire & Rubber Co., Ltd.

### Bins & Hoppers:

Can. Chicago Bridge & Iron Co., Ltd.  
Horton Steel Works, Ltd.  
The William Kennedy & Sons, Ltd.

### Bluestone:

The Consol'd Mining & Smelting Co.

### Boilers:

The William Kennedy & Sons, Ltd.

### Boxes, Cable Junction:

Standard Underground Cable Co. of Canada, Ltd.

Northern Electric Co., Ltd.

### Buggies, Mine Car (Steel):

Hendrick Manufacturing Co.  
Herbert, Alfred, Limited.  
Holman Bros., Ltd.

### Brazilian Ballas:

Diamond Drill Carbon Co.

### Brick:

Wettlaufer Bros.

**Bronze, Manganese, Perforated & Plain:**  
Hendrick Manufacturing Co.

### Buckets:

Canadian Ingersoll-Rand Co., Ltd.  
Canadian Link-Belt Co. Ltd.  
Hadfields, Limited.  
Hendrick Manufacturing Co.  
Herbert, Alfred, Limited.  
Holman Bros., Ltd.  
The William Kennedy & Sons, Ltd.  
Peacock Bros., Ltd.

### Bucket Lips:

Canadian Steel Foundries, Ltd.  
The William Kennedy & Sons, Ltd.

### Cable — Aerial and Underground:

Canada Wire & Cable Co.  
Standard Underground Cable Co. of Canada, Ltd.  
Peacock Brothers, Limited.

**Dredging Ropes:**

Allan Whyte & Co.  
Greening, B., Wire Co., Ltd.

**Drills, Air and Hammer:**

Canadian Ingersoll-Rand Co., Ltd.  
Canadian Rock Drill Co.  
Denver Rock Drill Mfg. Co., Ltd.  
Herbert, Alfred, Limited  
Holman Bros., Ltd.  
Sullivan Machinery Co.  
The Mine & Smelter Supply Co.

**Drills—Core:**

Canadian Ingersoll-Rand Co., Ltd.  
Herbert, Alfred, Limited  
Holman Bros., Ltd.  
Sullivan Machinery Co.

**Drill Steel Furnaces:**

Canadian Ingersoll-Rand Co., Ltd.  
Denver Rock Drill Mfg. Co.  
Herbert, Alfred, Limited  
Holman Bros., Ltd.  
Sullivan Machinery Co.

**Drills—Diamond:**

Sullivan Machinery Co.

**Drill Steel—Mining:**

Canadian Ingersoll-Rand Co., Ltd.  
Hadfields, Limited  
Mussens, Limited

**Drill Steel Sharpeners:**

Canadian Ingersoll-Rand Co., Ltd.

**Electric Condensers:**

Griswold & Co.  
Canadian Rock Drill Co.  
Denver Rock Drill Mfg. Co., Ltd.  
Herbert, Alfred, Limited  
Holman Bros., Ltd.  
Northern Canada Supply Co.

**Drills—Electric:**

Herbert, Alfred, Limited  
Holman Bros., Ltd.  
Sullivan Machinery Co.  
Northern Electric Co., Ltd.

**Drills—High Speed and Carbon:**

Hadfields, Limited  
Herbert, Alfred, Limited  
Holman Bros., Ltd.

**Ejectors:**

Canadian Ingersoll-Rand Co., Ltd.

**Electric Hoists:**

Canadian Mead-Morrison Co.

**Elevators:**

Canadian Link-Belt Co., Ltd.  
Sullivan Machinery Co.  
Northern Canada Supply Co.  
Hadfields, Limited.  
Jones & Glassco (Regd.).

**Engineering Instruments:**

Laurie & Lamb.  
C. L. Berger & Sons.

**Oil Engines:**

Canadian Ingersoll-Rand Co., Ltd.

**Engines:**

Canadian Sirrocco Co., Ltd.

**Engines—Gas and Gasoline:**

Sullivan Machinery Co.  
Gould, Shapely & Muir Co., Ltd.  
Laurie & Lamb.  
The Mine & Smelter Supply Co.

**Engines—Haulage:**

Canadian Ingersoll-Rand Co., Ltd.

**Engines—Steam:**

Canadian Ingersoll-Rand Co., Ltd.  
Laurie & Lamb.

**Engineers:**

Coyne, Alfred F. A.  
Dresser, John A.  
Door Co.  
Ferrier, W. F.  
Hore, R. E.  
Heves & Sons, Thos.  
Hersey Co., Ltd. Milton  
McEvoy, James C.  
Rogers, George R.  
Ross, Jas. G.  
Stewart, Robert H.  
Tyrrell, J. B.  
Whitman, Alfred B.  
Wilson, Ridgway R.

**Exhauster:**

Canadian Sirrocco Co., Ltd.

**Ferro-Alloys (all Classes):**

Canadian Steel Foundries, Ltd.  
Canadian Steel Foundries, Ltd.  
Everitt & Co.

**Fire Fighting Supplies:**

Gutta Percha & Rubber, Ltd.

**Flood Lamps:**

Northern Electric Co., Ltd.

**Flotation Oil:**

Hercules Powder Co.

**Flourspar:**

Consolidated Mining & Smelting Co.  
Everitt & Co.

**Forging:**

Canada Foundry & Forging, Ltd.

Herbert, Alfred, Limited

Holman Bros., Ltd.

Hull Iron & Steel Foundries, Ltd.

Smart-Turner Machine Co.

**Coal Screening Plants:**

Canadian Link-Belt Co., Ltd.  
Canadian Mead-Morrison Co.

**Cobalt Oxide:**

Everitt & Co.

**Compressors—Air:**

Belliss & Morcom, Ltd.  
Canadian Ingersoll-Rand Co., Ltd.  
Denver Rock Drill Mfg. Co.  
Herbert, Alfred, Limited  
Holman Bros., Ltd.  
Laurie & Lamb.  
Smart-Turner Machine Co.  
Peacock, Brothers, Limited.

**Concrete Mixers:**

Gould, Shapely & Muir Co., Ltd.

**Condensers:**

Canadian Ingersoll-Rand Co., Ltd.  
Smart-Turner Machine Co.  
Belliss & Morcom, Ltd.  
Laurie & Lamb.  
Peacock Brothers, Ltd.

**Concentrating Tables:**

Herbert, Alfred, Limited  
Holman Bros., Ltd.  
The Mine & Smelter Supply Co.

**Condensers—Electrical Static & Power:**

Griswold & Co.

**Consulters and Engineers:**

Milton Hersey Co., Ltd.

**Conveyors:**

Canadian Link-Belt Co., Ltd.  
Canadian Mead-Morrison Co.  
Jones & Glassco (Regd.).

**Conveyor Belts:**

Gutta Percha and Rubber, Ltd.

**Conveyor Flights:**

Canadian Link-Belt Co., Ltd.

**Conveyor—Trough—Belt:**

Canadian Link-Belt Co., Ltd.  
Hendrick Mfg. Co.  
Jones & Glassco, Regd.

**Copper:**

Consolidated Mining & Smelting Co.

**Couplings:**

Hans Renold of Can., Ltd.

**Cranes**

Canadian Link-Belt Co., Ltd.  
Canadian Mead-Morrison Co.  
Peacock Brothers, Limited  
Smart-Turner Machine Co.

**Crane Ropes:**

Allan Whyte & Co.  
Canada Wire & Cable Co.  
Greening, B., Wire Co., Ltd.

**Crucibles:**

The Mine & Smelter Supply Co.

**Crusher Balls:**

Canada Foundries & Forgings, Ltd.  
Herbert, Alfred, Limited  
Holman Bros., Ltd.  
Hull Iron & Steel Foundries, Ltd.  
Peacock Brothers, Limited.  
The William Kennedy & Sons, Ltd.

**Crushers:**

Canadian Ingersoll-Rand Co., Ltd.  
Herbert, Alfred, Limited  
Holman Bros., Ltd.  
Hull Iron & Steel Foundries, Ltd.  
Wettlaufer Bros.  
Lymans, Limited  
The Mine & Smelter Supply Co.  
Hadfields, Limited

**Cut Gears:**

Hans Renold of Can., Ltd.  
Jones & Glassco, Regd.  
The William Kennedy & Sons, Ltd.

**Cyanide:**

Cyanide Plant Equipment:  
The Door Co.  
The Mine & Smelter Supply Co.

**Derricks:**

Smart-Turner Machine Co.

**Diamond Drill Contractors:**

Smith & Travers  
Sullivan Machinery Co.

**Digesters:**

Can Chicago Bridge & Iron Co., Ltd.  
Horton Steel Works, Ltd.

**Diesel Engines:**

Belliss & Morcom, Ltd.  
Laurie & Lamb.

**Dies:**

Canada Foundries & Forgings, Ltd.  
Herbert, Alfred, Limited  
Hull Iron & Steel Foundries, Ltd.  
Holman Bros., Ltd.

**Drain Tile:**

Wettlaufer Brothers.

**Dredges:**

Canadian Mead-Morrison Co.

**Dredger Pins:**

Hull Iron & Steel Foundries, Ltd.

**Dredging Machinery:**

Hadfields, Limited  
Hull Iron & Steel Foundries Ltd.

**Cages:**

Canadian Ingersoll-Rand Co., Ltd.  
The Mine & Smelter Supply Co.  
Herbert, Alfred, Limited.  
Holman, Ltd.  
The William Kennedy & Sons, Ltd.

**Cables—Wire:**

Standard Underground Cable Co. Ltd.  
Canada Wire & Cable Co.

**Cable Railway Systems:**

Canada Wire & Cable Co.

**Cam Shafts:**

Canada Foundries & Forgings, Ltd.  
Herbert, Alfred, Limited  
Holman Bros., Ltd.  
Hull Iron & Steel Foundries, Ltd.  
Peacock Brothers, Ltd.  
The William Kennedy & Sons, Ltd.

**Car Dumps:**

Canadian Mead-Morrison Co.  
Herbert, Alfred, Limited.  
Holman Bros., Ltd.  
Sullivan Machinery Co.

**Cars:**

Canadian Mead-Morrison Co.  
Herbert, Alfred, Limited.  
Holman Bros., Ltd.  
John J. Garthshore.  
Peacock Brothers, Limited.  
The William Kennedy & Sons, Ltd.

**Car Fullers:**

Canadian Mead-Morrison Co.

**Car Wheels and Axles:**

Herbert, Alfred, Limited.  
Holman Bros., Ltd.  
Hull Iron & Steel Foundries, Ltd.  
John J. Garthshore.  
Peacock Brothers, Limited  
The William Kennedy & Sons, Ltd.

**Carriers (Gravity):**

Jones & Glassco, Regd.

**Cast Steel Gears:**

Canada Foundries, Ltd.  
The William Kennedy & Sons, Ltd.

**Castings (Iron and Steel):**

Herbert, Alfred, Limited.  
Holman Bros., Ltd.  
Hull Iron & Steel Foundries, Ltd.  
Peacock Brothers, Limited  
The William Kennedy & Sons, Ltd.

**Cement Machinery:**

Hadfields, Limited.  
Hull Iron & Steel Foundries, Ltd.  
The William Kennedy & Sons, Ltd.

**Chains:**

Jones & Glassco, Regd.  
Canadian Link-Belt Co., Ltd.  
Greening, B., Wire Co., Ltd.

**Chain Drives:**

Jones & Glassco (Regd.).

**Chain Drives—Silent and Steel Roller:**

Canadian Link-Belt Co., Ltd.  
Hans Renold of Can., Ltd.  
Jones & Glassco (Regd.).

**Chemist:**

Thos. Heyes & Sons.  
Milton Hersey Co.  
Ledoux & Co.

**Chrome Ore:**

Everitt & Co.

**Crusher Jaws:**

Canadian Steel Foundries, Ltd.  
The William Kennedy & Sons, Ltd.

**Crushing Rolls:**

Canadian Steel Foundries, Ltd.  
The William Kennedy & Sons, Ltd.

**Classifiers:**

The Dorr Company

**Clutches:**

Canadian Link-Belt Co., Ltd.  
Hans Renold of Can., Ltd.

**Coal:**

Dominion Coal Co.  
Nova Scotia Steel & Coal Co.

**Coal Cutters:**

Sullivan Machinery Co.  
Canadian Ingersoll-Rand Co., Ltd.  
Herbert, Alfred, Limited  
Holman Bros., Ltd.  
Peacock Brothers, Limited

**Coal Crushers:**

Canadian Link-Belt Co., Ltd.  
Peacock Brothers, Limited

**Coal Mining Machinery:**

Canadian Ingersoll-Rand Co., Ltd.  
Canadian Rock Drill Co.  
Denver Rock Drill Lfg. Co., Ltd.  
Sullivan Machinery Co.  
Hadfields, Limited.  
Hendrick Mfg. Co.  
Herbert, Alfred, Limited  
Holman Bros., Ltd.



- Pipes:**  
Consolidated Mining & Smelting Co.  
**Coal and Coke Handling Machinery:**  
Canadian Linke-Belt Co. Ltd.
- Coal Pick Machines:**  
Canadian Ingersoll-Rand Co., Ltd.  
Herbert, Alfred, Limited  
Holman Bros., Ltd.  
Sullivan Machinery Co.
- Frogs:**  
Canadian Steel Foundries, Ltd.  
Hull Iron & Steel Foundries.  
John J. Gartshore.
- Furnaces—Assay:**  
Lymana, Limited.  
Mine & Smelter Supply Co.
- Gasoline Engines:**  
Belliss & Morcom, Ltd.  
Laurie & Lamb.
- Gasoline Extraction Compressors:**  
Canadian Ingersoll-Rand Co., Ltd.  
Sullivan Machinery Co.
- Gasoline Tanks:**  
Can. Chicago Bridge & Iron Co., Ltd.  
Horton Steel Works, Ltd.
- Gaskets:**  
Gutta Percha & Rubber, Ltd.
- Gears:**  
Hans Renold of Canada, Ltd.  
Jones & Glassco, Regd.  
The William Kennedy & Sons, Ltd.
- Gears (Cast):**  
Canadian Link-Belt Co., Ltd.  
Hull Iron & Steel Foundries, Ltd.  
The William Kennedy & Sons, Ltd.
- Gears, Machine Cut:**  
The Hamilton Gear & Machine Co.  
The William Kennedy & Sons, Ltd.
- Gold Refiners:**  
Goldsmith Bros.
- Gold Trays:**  
Can. Chl. Bridge & Iron Works, Ltd.  
Horton Steel Works, Ltd.
- Grab-Buckets:**  
Canadian Mead-Morrison Co.
- Hand Cars:**  
Sylvester Mfg. Co., Ltd.
- Hose:**  
Goodyear Tire & Rubber Co.  
Gutta Percha & Rubber, Ltd.  
Dunlop Tire & Rubber Co.
- Hammer Rock Drills:**  
Canadian Ingersoll-Rand Co., Ltd.  
Canadian Rock Drill Co.  
Denver Rock Drill Mfg. Co., Ltd.  
Herbert, Alfred, Ltd.  
Sullivan Machinery Co.
- Hangers and Cables:**  
Stan. Underground Cable Co., Ltd.
- Heating Systems:**  
Canadian Sirocco Co., Ltd.
- High Speed Steel:**  
Hadfields, Ltd.
- Hoists—Air, Electric and Steam:**  
Canadian Ingersoll-Rand Co., Ltd.  
Canadian Rock Drill Co.  
Denver Rock Drill Mfg. Co., Ltd.  
Herbert, Alfred, Ltd.  
Holman Bros., Ltd.  
Jones & Glassco, Regd.  
Mine & Smelter Supply Co.  
Canadian Link-Belt Co., Ltd.  
Peacock Bros., Ltd.  
Sullivan Machinery Co.
- Hoisting Towers:**  
Canadian Mead-Morrison Co.
- Hose:**  
Gutta Percha & Rubber, Ltd.
- Hydraulic Machinery:**  
c Hadfields, Ltd.  
Belliss & Morcom, Ltd.  
Laurie & Lamb.  
The William Kennedy & Sons, Ltd.
- Oil Storage Tanks:**  
Can. Chicago Bridge & Iron Co., Ltd.  
Horton Steel Works, Ltd.  
The Toronto Iron Works, Ltd.
- Industrial Chemists:**  
Hersey, M. & Co., Ltd.
- Insulating Compounds:**  
Stan. Underground Cable Co.
- Inspectors:**  
Hersey, M. & Co., Ltd.
- Jacks:**  
Northern Canada Supply Co.
- Jaw & Gyratory Crushers:**  
Engineering & Equipment.  
Herbert, Alfred, Limited.  
Holman Bros., Ltd.
- Lamp-Miners:**  
Northern Electric Co.  
Peacock Bros., Ltd.
- Lead (Pig):**  
Consolidated Mining & Smelting Co.
- Levels:**  
C. L. Berger & Sons.
- Light & Heavy Steel Plate Construction:**  
Hendrick Mfg. Co.  
The William Kennedy & Sons, Ltd.
- Locomotives (Steam, Compressed Air and Storage):**  
Canadian Ingersoll-Rand Co., Ltd.  
Laurie & Lamb.
- Link Belt:**  
Canadian Link-Belt Co., Ltd.  
Northern Canada Supply Co.  
Jones & Glassco, Regd.
- Machine Guards:**  
Greening, B. Wire Co., Ltd.
- Magnesium Metal:**  
Everitt & Co.  
Hull Iron & Steel Foundries, Ltd.
- Manganese Steel:**  
Hadfields, Ltd.  
Hull Iron & Steel Foundries, Ltd.
- Manganese-Steel Trackworks:**  
Canadian Steel Foundries, Ltd.
- Metal Merchants:**  
Consolidated Mining & Smelting Co.  
C. L. Constant Co.  
Everitt & Co.
- Metallurgical Engineers:**  
The Dorr Co.
- Metallurgical Machinery:**  
Dwight & Lloyd Sintering Co.  
The Dorr Co.  
The Mine & Smelter Supply Co.
- Metal Work, Heavy Plates:**  
Can. Chicago Bridge & Iron Co., Ltd.  
Horton Steel Works, Ltd.  
The William Kennedy & Sons, Ltd.
- Mica:**  
Everitt & Co.
- Mine Cars:**  
Canadian Steel Foundries, Ltd.  
The William Kennedy & Sons, Ltd.
- Mining Engineers:**  
Hersey, M. & Co., Ltd.
- Mining Drill Steel:**  
Hadfields, Limited.
- Mining Requisites:**  
Dominion Wire Rope Co., Ltd.  
Hadfields, Limited.  
Hull Iron & Steel Foundries, Ltd.
- Mining Ropes:**  
Dominion Wire Rope Co., Ltd.  
Peacock Brothers, Ltd.
- Mine Surveying Instruments:**  
C. L. Berger & Sons.
- Molybdenite:**  
Everitt & Co.
- Motors:**  
Peacock Brothers, Ltd.
- Nickel:**  
The Mond Nickel Co., Ltd.
- Ore Handling Equipment:**  
Canadian Link-Belt Co., Ltd.  
Canadian Mead-Morrison Co.  
Herbert, Alfred, Limited.
- Ore Sacks:**  
Northern Canada Supply Co.
- Ore Testing Works:**  
Ledoux & Co.  
Can. Laboratories.  
Hoyt Metal Co.
- Ores & Metals—Buyers & Sellers of:**  
Geo. G. Blackwell.  
Consolidated Mining & Smelting Co.  
Everitt & Co.
- Oils:**  
Hercules Powder Co.
- Pavers:**  
Wettlaufers Brothers.  
Gutta Percha & Rubber, Ltd.  
Laurie & Lamb.
- Perforated Metals:**  
Hendrick Mfg. Co.  
Canada Wire & Iron Goods Co.  
Greening, B. Wire Co.
- Pillow Blocks:**  
Canadian Link-Belt Co., Ltd.  
The William Kennedy & Sons, Ltd.
- Pipe — Wood Stave:**  
Pacific Coast Pipe Co.  
Mine & Smelter Supply Co.  
Canadian Ingersoll-Rand Co., Ltd.
- Piston Rock Drills:**  
Mine & Smelter Supply Co.  
Herbert, Alfred, Limited.  
Holman Bros., Ltd.
- Plate Works:**  
Can. Chl. Bridge & Iron Co., Ltd.  
Hendrick Mfg. Co.  
The William Kennedy & Sons, Ltd.  
Horton Steel Works, Ltd.
- Platinum Refiners:**  
Goldsmith Brothers.
- Pneumatic Tools:**  
Canadian Ingersoll-Rand Co., Ltd.  
Herbert, Alfred, Limited.  
Holman Bros., Ltd.
- Portable Column Hoists:**  
Canadian Ingersoll-Rand Co., Ltd.  
Denver Rock Drill Mfg. Co.  
Herbert, Alfred, Limited.  
Holman Bros., Ltd.  
Sullivan Machinery Co.
- Power Factor Correcting Devices:**  
Griswold & Co.
- Power Condensers:**  
Griswold & Co.
- Prospecting Mills & Machinery:**  
Mine & Smelter Supply Co.
- Pumps—Pneumatic:**  
Canadian Ingersoll-Rand Co., Ltd.  
Smart-Turner Machine Co.  
Sullivan Machinery Co.
- Pumps—Steam:**  
Canadian Ingersoll-Rand Co., Ltd.  
Northern Canada Supply Co.  
Peacock Brothers, Ltd.  
Smart-Turner Machine Co.
- Pumps—Turbines:**  
Smart-Turner Machine Co.  
Canadian Ingersoll-Rand Co., Ltd.  
Laurie & Lamb.  
Peacock Brothers, Ltd.
- Pumps—Vacuum:**  
Canadian Ingersoll-Rand Co., Ltd.  
Smart-Turner Machine Co.  
Peacock Brothers, Ltd.
- Pumps—Valves:**  
Peacock Brothers, Ltd.
- Pulleys Shafting and Hangers:**  
The William Kennedy & Sons Ltd.
- Pulverizers—Laboratory:**  
Herbert, Alfred, Limited.  
Holman Bros., Ltd.  
Mine & Smelter Supply Co.
- Pumps—Boiler Feed:**  
Canadian Ingersoll-Rand Co., Ltd.  
Smart-Turner Machine Co.  
Peacock Brothers, Ltd.
- Pumps—Centrifugal:**  
Canadian Ingersoll-Rand Co., Ltd.  
Laurie & Lamb.  
Peacock Brothers, Limited.  
Smart-Turner Machine Co.
- Pumps—Diaphragm:**  
The Dorr Company.  
The William Kennedy & Sons, Ltd.
- Pumps—Electric:**  
Canadian Ingersoll-Rand Co., Ltd.  
Laurie & Lamb.
- Peacock Brothers, Ltd.**  
Smart-Turner Machine Co.
- Pumps—Sand & Slime:**  
Canadian Ingersoll-Rand Co., Ltd.  
Laurie & Lamb.  
Mine & Smelter Supply Co.  
Peacock Brothers, Ltd.  
Smart-Turner Machine Co.  
Sylvester Mfg. Co., Ltd.
- Push Cars:**  
Sylvester Mfg. Co.
- Poultry Netting:**  
Greening, B. Wire Co., Ltd.
- Quarrying Machinery:**  
Canadian Ingersoll-Rand Co., Ltd.  
Canadian Rock Drill Co.  
Denver Rock Drill Mfg. Co., Ltd.  
Hadfields, Limited.  
Herbert, Alfred, Limited.  
Holman Bros., Ltd.  
Sullivan Machinery Co.

- Rails:**  
Hadfields, Limited.  
John J. Gartshore.
- Refiners:**  
Goldsmith Brothers.
- Riddles:**  
Hendrick Mfg. Co.
- Rod Mills:**  
Mine & Smelter Supply Co.
- Roll Shells:**  
The William Kennedy & Sons, Ltd.  
Canadian Steel Foundries, Ltd.
- Roller Chain:**  
Hans Renold of Canada, Ltd.  
Canadian Link-Belt Co., Ltd.  
Jones & Glassco, Regd.
- Rope—Manilla & Jute:**  
Jones & Glassco, Regd.  
Allan, Whyte & Co.
- Rope—Wire:**  
Anglo Canadian Wire Rope Co.  
Allan, Whyte & Co., Ltd.  
Canada Wire & Cable Co.  
Canada Wire & Iron Goods Co.  
Dominion Wire Rope Co., Ltd.  
Greening, B. Wire Co.
- Rolls—Crushing:**  
Canadian Ingersoll-Rand Co., Ltd.  
Everitt & Co.  
Hadfields, Limited.  
Hull Iron & Steel Foundries, Ltd.  
Herbert, Alfred, Ltd.  
Holman Bros., Ltd.  
Wettlaufer Bros.
- Samplers:**  
Canada Metal Co.  
Ledoux & Co.  
Milton Hersey Co.  
Thos. Heyes & Son.  
Mine & Smelter Supply Co.
- Screens:**  
Canadian Ingersoll-Rand Co., Ltd.  
Greening, B. Wire Co.  
Hendrick Mfg. Co.  
Canada Wire & Iron Goods Co.
- Screens—Cross Patent Flanged Lip:**  
Hendrick Mfg. Co.
- Screens—Perforated Metal:**  
Hendrick Mfg. Co.
- Screens—Shaking:**  
Canadian Link-Belt Co., Ltd.  
Hendrick Mfg. Co.
- Screens—Revolving:**  
Canadian Link-Belt Co., Ltd.  
Hendrick Mfg. Co.  
The William Kennedy & Sons, Ltd.
- Separators:**  
Smart-Turner Machine Co.  
Mine & Smelter Supply Co.
- Sewer Pipes:**  
Wettlaufer Bros.
- Shaft Contractors:**  
Hendrick Mfg. Co.
- Sheet Metal Work:**  
Hendrick Mfg. Co.
- Sheets—Genuine Manganese Bronze:**  
Hendrick Mfg. Co.
- Sheets and Dies:**  
Hull Iron & Steel Foundries, Ltd.  
Peacock Brothers, Ltd.  
The William Kennedy & Sons, Ltd.
- Ship Loaders:**  
Canadian Mead-Morrison Co.
- Silent Chain:**  
Canadian Link-Belt Co., Ltd.  
Hans Renold of Canada, Ltd.  
Jones & Glassco, Regd.
- Silent and Steel Roller:**  
Canadian Link-Belt Co., Ltd.  
Jones & Glassco, Regd.
- Saline Refiners:**  
Goldsmith Brothers.
- Smelters:**  
Goldsmith Bros.
- Sledges:**  
Canada Foundries & Forgings.
- Sintering:**  
Dwight & Lloyd Sintering Co., Inc.
- Smoke Stacks:**  
Can. Chicago Bridge & Iron Co., Ltd.  
Horton Steel Works, Ltd.  
Hendrick Mfg. Co.  
The William Kennedy & Sons, Ltd.
- Special Machinery:**  
The William Kennedy & Sons, Ltd.
- Spelter:**  
Consolidated Mining & Smelting Co.
- Sprockets:**  
Hans Renold of Canada, Ltd.
- Canadian Link-Belt Co., Ltd.  
Jones & Glassco, Regd.  
The William Kennedy & Sons, Ltd.
- Static Condensers:**  
Griswold & Co.
- Spring Coil & Clips Electric:**  
Canadian Steel Foundries, Ltd.
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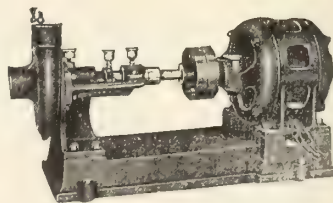
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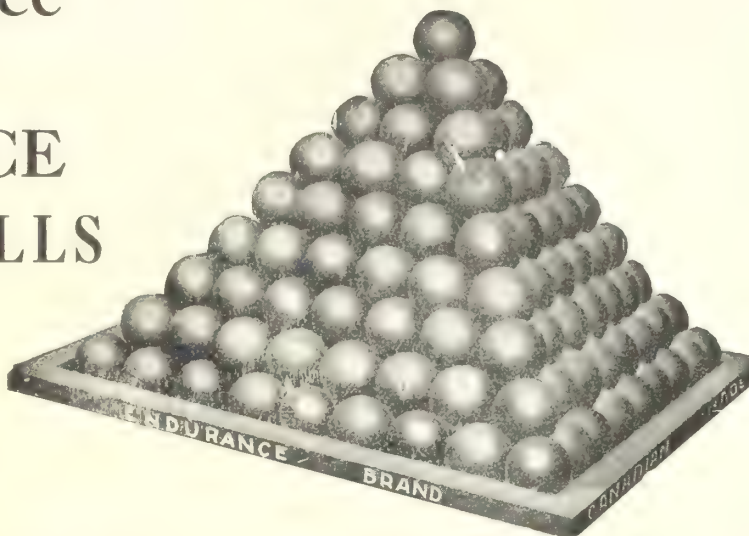
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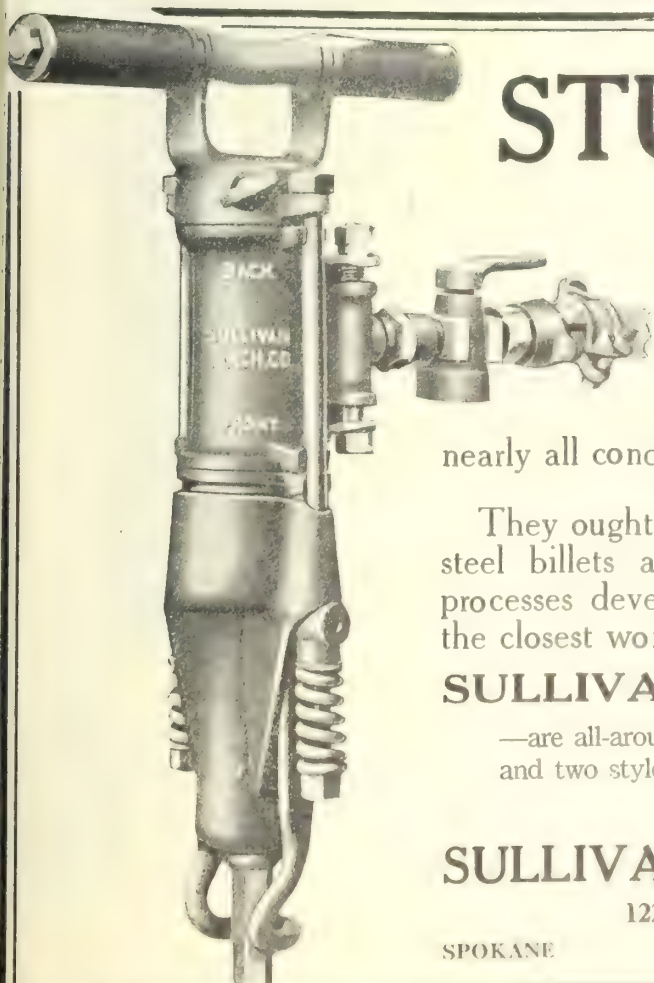
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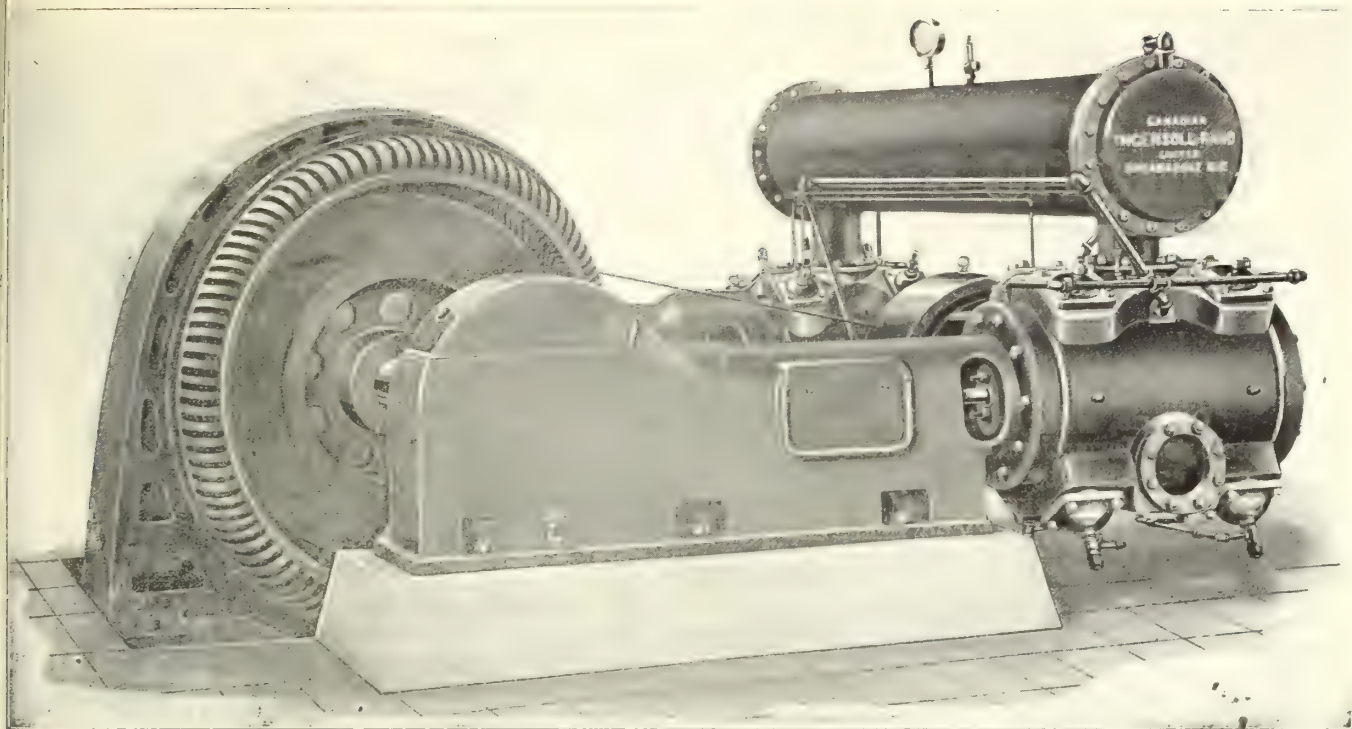


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# Ontario's



# Minerals

PROVINCE OF ONTARIO

DEPARTMENT OF MINES

HON H. MILLS, Minister of Mines

## Mineral Areas.

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The following figures show the rapid growth of Ontario's mineral industry by five-year periods since 1891:

| Year.         | Value.      | Year.         | Value.       |
|---------------|-------------|---------------|--------------|
| 1891 .. . . . | \$4,705,672 | 1906 .. . . . | \$22,388,383 |
| 1896 .. . . . | 5,235,003   | 1911 .. . . . | 41,976,797   |
| 1901 .. . . . | 11,831,086  | 1916 .. . . . | 65,303,822   |

## Dividends.

Dividends and bonuses paid to the end of 1921 amounted to \$23,140,734 for gold mining companies, and \$84,388,185 for silver mining companies or a total of \$107,528,919.

## Mining Regulations.

A miner's license costs \$5.00 per annum, and entitles the holder to stake out in any or every mining division three claims of 40 acres each. After performing 200 days' assessment work on a claim, patent may be obtained from the Crown on payment of \$2.50 or \$3.00 per acre, depending on location in unsurveyed or surveyed territory.

## Assay Office.

The Provincial Assay Office at No. 5 Queen's Park, Toronto, is maintained by the Department of Mines for the free identification of minerals, free assays under the provisions of the Mining Act of Ontario, and also for general assay work as per the Schedule of Charges which may be obtained on application.

## Temiskaming Testing Laboratories

The Department maintains, at Cobalt, an ore sampling and testing laboratory which is now prepared to receive parcels of gold ore from 100 pounds upward, and after sampling and assaying the same to pay to the shipper the value thereof, less treatment charges. The purpose is to afford a market for ores extracted by prospectors and others in developing their mining claims, enabling them to obtain funds which they can use for further work and to report on the most satisfactory method of treatment. Fuller information may be obtained on application to the Manager, Temiskaming Testing Laboratories, Cobalt, Ontario.

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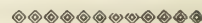
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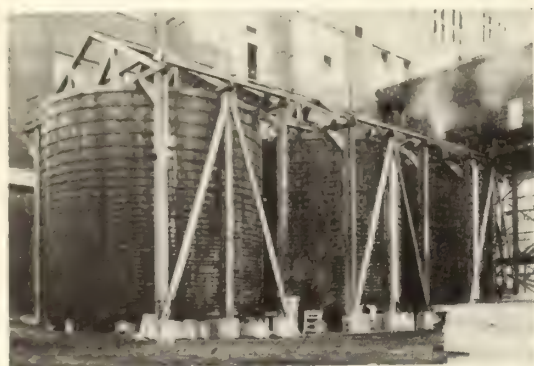
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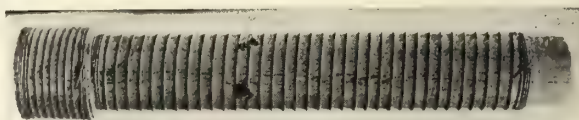
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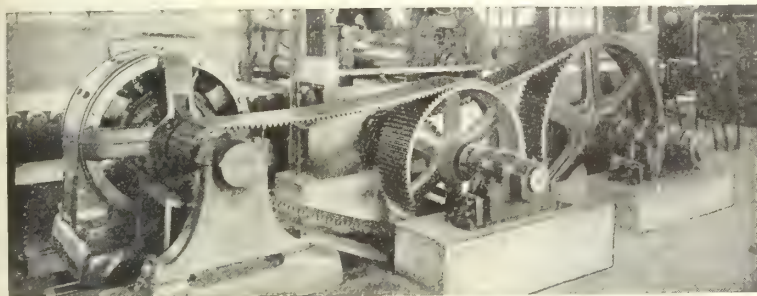
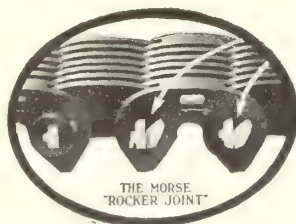
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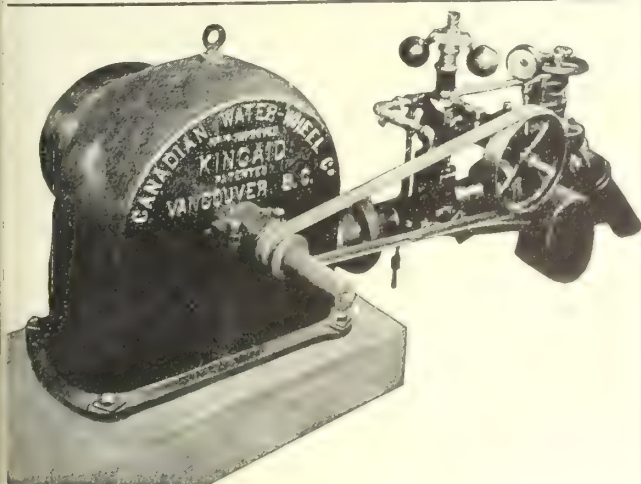
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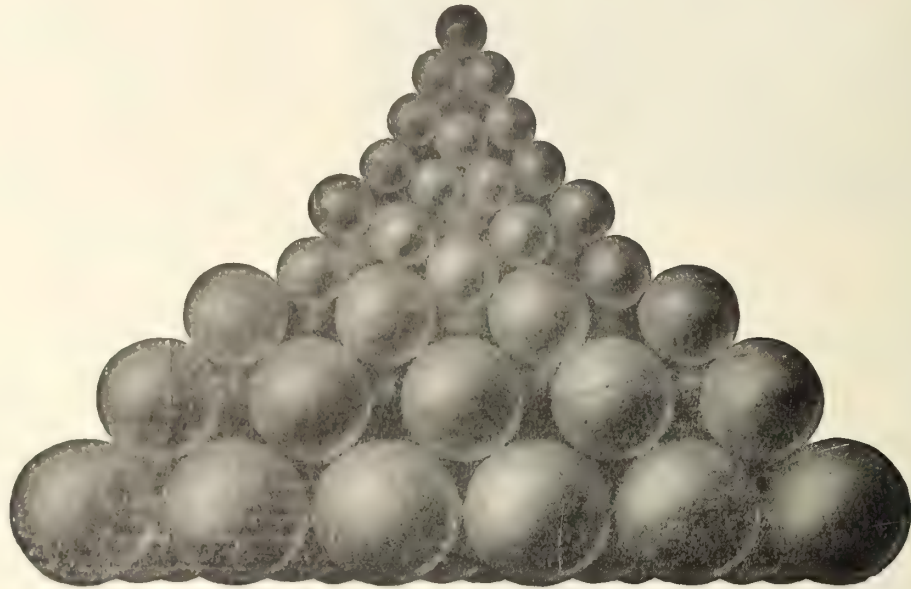
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PUBLISHED WEEKLY

Devoted to the Science and Practice of Mining, Metallurgy and the Allied Industries; and more particularly to their progress in Canada

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GARDENVALE, Que., March 9th, 1923

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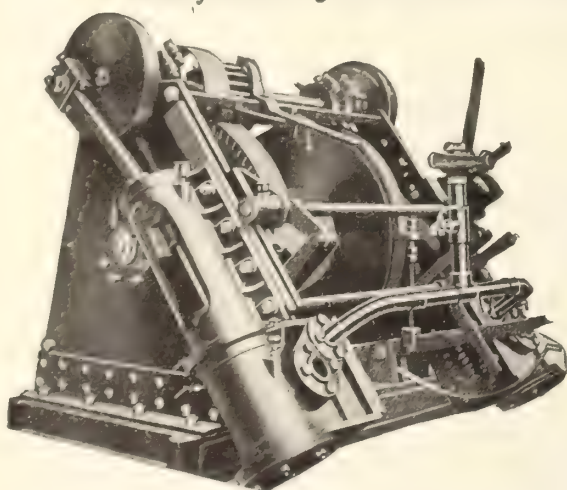
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# -:- EDITORIAL -:-

## NATIONAL RESEARCH PROBLEMS

The conference on research held in Ottawa last month was, as a conference, a very successful gathering, well calculated to consolidate the opinion of the participants and to elucidate for the public benefit the ideas of the leading authorities on research. These are the practical results to date; but much is to follow, unless we mistake the intention of those responsible for the conference. Action on a matter of such importance must be deliberate and well founded, and we have no doubt that such action will ensue in due course.

The establishment of a national research organization to correlate and supplement the existing agencies was approved, almost without question from the delegates. The exact form this organization should take remains to be determined, though its general lines are already clearly delineated. Besides fulfilling the functions of a Bureau of Standards and correlating (though not necessarily controlling) the efforts of existing research organizations, it must provide facilities for such research, both purely scientific and industrial, as is not already sufficiently provided for in Canada. Most important of all, it must provide for a study of Canada's problems in a comprehensive way, such as is now the duty of no department or institution, either public or private, and for the lack of which our country is suffering at present a loss whose dimensions few realize.

To make clear this last point, let us take a concrete example. Pulpwood is now being cut in Canada at the rate of four million cords a year. Mixed with the coniferous woods and the small amount of poplar used is a certain proportion of hardwood (birch and maple) and poplar that is not only useless, but is detrimental insofar as it tends to produce a second crop of its own sort in place of the more useful pulpwoods. This worse than useless wood comprises at least ten per cent of the forest growth and in certain districts is as much as fifty percent. It has even been proposed seriously to slash and burn this hardwood and poplar in order to help the growth of a second crop of conifer. Probably a million cords of this wood is now wasted annually.

How can this latent asset be put to practical use? At present it is everybody's job, and nobody's job, to solve this problem. There are distinct possibilities for the use of this wood as charcoal. A million cords of wood will make half a million tons of charcoal

There are numerous metallurgical uses for charcoal in large quantities, if it is cheap enough. Prior to 1914 charcoal from Canadian wood distillation plants was worth \$10.00 a ton at the plant, the by-products providing a further value. The two cords of wood required to make this ton of charcoal cost \$10.00 at the plant. It is obvious that charcoal could be made in favourable localities from birch and poplar by the old method of firing in turf-covered heaps at a less cost than \$10.00 a ton. If there were available in the same locality cheap hydro-electric power and minerals of the proper sort, we might have the basis for a successful electro-metallurgical industry. Such, for example, might prove to be the case round about Lake St. John, in Quebec, where there is abundant water-power capable of cheap development and a vast resource in wood and where a trifling amount of investigation has already disclosed some mineral resources of prospective value.

At present the metallurgist and miner, the pulp and paper specialist and the water-power engineer are working away, each at his own line. Any correlation of effort among these and similar workers is chiefly effected by chance, or by the good offices of a man possessed of financial ability combined with vision. Such correlation might well be made the business of a national research organization. Only by some such means can we ensure that opportunities for the use of our natural resources will not be lost for the lack of someone to delineate them.

## CONSTRUCTIVE PUBLICITY

Public misconception of the meaning of the mining industry is one of the principal clogs to progress. To the man on the street, mining is nothing but a sublimated gamble. The prevailing ignorance as to the significance of our mineral resources is alike deplorable and dangerous. The informed mining man who in any way helps to enlighten this Egyptian darkness is doing a real service to the community.

On another page we present some extracts from an address given by Mr. Arthur A. Cole, mining engineer for the Temiskaming and Northern Ontario Railway, before the Toronto Empire Club. It is unfortunate that space does not permit us to print the address "in extenso." However, the paragraphs that we do reproduce are pregnant with suggestion and inspiration.

For instance, in referring to the productiveness of



Cobalt. Mr. Cole points out that "the camp has produced at the rate of two tons of pure silver for every working day for 19 years, and at the present time is producing at the rate of one and three-quarter tons per working day." This is the right and assimilable form in which to present such information to the public. The ordinary citizen does not think in ounces, but the word "tons" means something to him.

Mr. Cole took special pains to impress upon his hearers the fact that Cobalt and the outlying silver districts, quite contrary to popular assumptions, are by no means exhausted. To emphasize this he quoted Mr. C. W. Knight, of the Ontario Department of Mines to this effect: "Mining will doubtless be carried on for generations either in or around Cobalt, or in the outlying areas of Gowganda, South Lorrain, Casey, Montreal River, and elsewhere."

As to gold production, Mr. Cole alludes to the fact that of all gold producing countries Northern Ontario alone is increasing her outputs. This has a significance all its own.

The projected extension of the T. & N. O. Railway is strongly supported by the facts and considerations adduced by Mr. Cole. That a continuation of the line to James Bay is warranted seems indisputable. The enormous total of undeveloped water power available in the region tributary to James Bay is impressive. But most impressive is the bald fact that in the few hundred square miles that form only a fractional percentage of the 2,000,000 square miles awaiting closer exploration, there should have been found such unexpected wealth.

The tenor of the address is buoyantly and rationally hopeful. Reasoning "a fortiori", Mr. Cole demonstrates that mining will be the foundation stone on which will be built the industrial future of Northern Ontario.

### MENTAL "SLOPPINESS"

Most of us, if we find our bodies getting out of condition, are apt to get greatly perturbed over the fact. We will take to golf, or go in for a course of physical culture, or resort to a scientific dietary, or what not. For we realize that our bodies are complicated pieces of mechanism, but that, while liable to get sadly out of order, they are, fortunately, amenable to proper treatment, in a large number of cases, at any rate.

But what about our minds? The mind is a more complicated affair than the body. It is liable to get not less badly out of order. Yet, happily, it is, perhaps, even more amenable to proper treatment. But to how many of us does it ever occur that our minds can get out of condition and require to be put in order? And yet the mind has its own organs just as much as the body—its invisible muscles and arteries and so forth. Some of these organs may be atrophied.

some starved, some out of shape, and so on. And a large proportion of those thus suffering are doing nothing to put their minds in order. They are the victims of chronic mental "sloppiness" — that is to say, they possess minds which are not doing the work that minds are capable of doing.

Some are conscious of this mental "sloppiness." Others suffer from it, but are unconscious of it. They may see the effect of it in their work, but they are ignorant of the cause. Yet the signs of the latter should be plain for all to read.

First, there is procrastination — the putting off until tomorrow what ought to be done today. This is a matter with regard to which it is very easy to deceive ourselves. The distasteful job is one that will be better done for waiting, we may argue. Or we require time for consideration before we can tackle it adequately. Or we are "too busy" to attend to it now. And so on *ad infinitum*. But, whatever the reason — or rather the excuse — that we assign to ourselves for our procrastination, the result is the same. The distasteful work is side-tracked, the easy work is given attention.

Then there is loss of interest in our work. Almost invariably — except in cases where the job is palpably too big for the man — this signifies lack of effort. For it is a difficult thing to lose one's interest in a job at which one is working with all his might and main. The man who is master of his work does not lose interest in it. But the man who has let his work master him is almost sure to do so.

Then there is want of "stickatitiveness" — the desire to change one's work. It is only by sticking at the work that we are doing, that we outgrow it — grow big enough for the larger responsibilities that larger work entails. "Distant fields look green," but the man who is always hankering after "pastures new" — who says in his heart that his work is all drudgery, while the other fellow's is colorful, interesting and free from grind—is mentally "sloppy."

Indeed, procrastination, loss of interest in our work, and hankering after change of work all are due to mental "sloppiness" and inefficiency.

There is one sure cure for mental "sloppiness"—concentration. Let the procrastinator, instead of giving the distasteful job the "go-by", go to it. Let the man who finds he is losing interest in his job ask himself whether he is doing his work to the limit of his ability; let him give an honest answer to the question, and then realize that we cannot get happiness out of our daily job, whatever it may be, without paying the price of the best work that is in us, and act accordingly. Let the man who desires change of work take to heart the lesson that it is only when he himself has ceased to grow that his opportunities look limited.

The late Mr. Chamberlain — than whom no man worked harder or more quickly — used to say that if he surpassed other men in any quality at all, it was in his power of concentration. And this faculty of concentration can be acquired and cultivated. Of course, it needs will-power — the will not only to begin, but to continue, to concentrate. But the more we will ourselves to concentrate, the easier it becomes to do so. An enormous percentage of us are, whether consciously or not, mentally "sloppy". Nearly all of us can cure ourselves of that defect if we will. But the remedy is within us.

Incidentally, it may be mentioned that one of the most effective aids to concentration at will is to be found in memorizing. That, indeed, is one of the best kinds of calisthenics for the mind. There are few mental exercises better than learning great prose or poetry by heart. Ten lines a day for two months — there is a concrete remedy for mental debility. For the chief, but not the only, merit of learning by heart as an exercise is that it compels the mind to concentrate.

### QUEBEC POWER FOR ONTARIO GOLD MINES

The encouraging developments in the new gold district of northwestern Quebec and the resumption of activity on some older prospects there whose value had never been tested, lends added point to the recent recurrence of the old suggestion that Quinze River power might be developed for the use of Porcupine gold mines. The Quinze River powers are 100 miles from Porcupine, 45 miles from Kirkland Lake, and 50 miles from the prospects in Rouyn township.

The falls and rapids at Devil Chutes, two to three miles from Lake Temiskaming, are capable of developing 36,000 horsepower from a 60-foot head. This power is privately owned. Above this there is available an additional 90,000 horsepower, which could be developed as two equal powers each under 74 feet head. All this latter power is still owned by the Quebec government, which is notably fair in its terms to genuine investors. A storage dam at the foot of Quinze Lake has made its large expense available for storage purposes, thus enhancing the natural power capacity of the falls below; and there are opportunities for using other large lakes farther up on the watercourse for additional storage when required.

The Quinze River, with its excellent waterpowers and its hinterland of 9,500 square miles covered with pulp-wood and timber, much of which grows on arable land, is sure to be a seat of industrial activity in the near future. Should the Ontario government continue to block the wheels of progress with its present hesitating policy with regard to the waterpowers on the Abitibi River, nothing would be more reasonable than the development of Quinze River power for use in the goldfields of Ontario.

### EDITORIAL NOTES

There is now quite a scramble at Matachewan in Northern Ontario. It is not like the scramble in Rouyn township in Quebec, where a winter rush is on; it is more like scrambled eggs. There has been a bewildering succession of stock flotations, reorganizations, mergers and consolidations, mixed up into a mass that it is hoped will be palatable for investors. We shall not attempt to unscramble the scramble. Some of the eggs are not strictly fresh, and besides we suspect that a "bad egg" is mixed up in the affair.

As we go to press, the Canadian miners from east, north and west, and visitors from the south, are gathering for what promises to be an unusually interesting and important annual meeting of the Canadian Institute of Mining and Metallurgy. We shall give a record of the proceedings next week.

### SAINT PETER AND THE LONE PROSPECTOR

A lone prospector lay a-dying;  
Wild round his hut the winds were crying;  
Soon came the racking throes of death,  
And he exhaled his final breath.

\* \* \*

As, winging fast through space, he flew,  
He felt uncomfortably blue;  
He wasn't confident what greeting  
Saint Peter would vouchsafe on meeting  
A fellow who had knocked around  
And sinned as men to sin are bound.  
Saint Peter spoke him with the air  
Of asking him what fetched him there.  
Saint Peter, also, when he found  
Him a prospector, froze and frowned.  
"Hold" quoth Saint Peter, "sirrah, steady!  
"I've got too many men already  
"From Cobalt and from Porcupine!  
"I cannot keep those birds in line.  
"I'd give my halo and my keys  
"To find myself relieved of these."  
The new arrival up and spake:  
"The bet is on, shake, Peter, shake!  
"Admit me and I'll guarantee  
"That in three days there will not be  
"One darned prospector left but me."  
"You're on," said Peter, "if you know  
"A trick like that, why, in you go."  
Well, sure enough, ere thrice the sun  
Had set, prospectors one by one  
Came rushing out of Heavens gate  
As if they feared to be too late.  
And, last, the new arrival came.  
Saint Peter gasped, cried, "What's the game?"  
Said he, "Saint Peter, I just told  
"These guys about a strike of gold  
"That had been made way down in II-II—  
"And now—I've told so many—well—  
"It only struck me just this minute—  
"There may be something really in it!"

\* \* \*

Thus, then, we see the reason why  
Prospectors, when they come to die,  
Find little comfort in the sky.

J. C. M.



# Impressions of the Ottawa Conference on Research

By A. G. HUNTSMAN.\*

The Conference on Research called by the Canadian Manufacturers' Association met at Ottawa on February 20, 21 and 22. Five sessions in all were held, with the following subjects presented:— (1) work and plans of the Advisory Council for Scientific and Industrial Research; (2) work of the research branches of the Government departments; (3) research work of the universities and agricultural colleges; (4) work of the research departments of commercial firms; and (5) general discussion. It appeared that the manufacturers desired to learn what research was being done and planned in directions bearing upon manufacturing, either directly, or indirectly in connection with the fundamental industries, (farming, fishing, mining, and forestry), that provide the raw materials for manufacturing. It is intended to publish these data on research. No attempt was made to crystallize (either in resolutions or otherwise) the various views presented at the conference. It remains to be seen what use the Canadian Manufacturers' Association will make of the information concerning research that has been thus disclosed.

It was a distinct revelation to hear of the very extensive nature and the extraordinary variety of the research work being carried on in the Government departments (particularly the Department of Agriculture) and in the universities (particularly those of Toronto and McGill). It was not apparent that there was any duplication in this research work, although in several cases owing to there having been coöperation, the same work was reported upon by more than one body. There was, however, duplication in claims, each of several bodies claiming that it had killed the grasshoppers out west! This is reminiscent of the answers to the question of "who won the war."

No less important was the demonstration of the great length of the chain of work between the coming of a new idea and its actual application in the industries. New ideas came to light in the investigations in pure science in university laboratories, and these ideas form the starting point for further investigations. The varied facts and theories so provided are in part at some time taken up in the laboratories of applied science and their bearing on industrial problems more or less clearly demonstrated. Finally commercial firms take them up either directly or through their research laboratories and actually make use of them in industrial processes. If it is true that there is no royal road to learning, it is still more true that there is no easy road to industrial progress. Occasionally short cuts to improvements in processes are found, but almost always attempts to reach the goal by plunging blindly and at random end in failure. Sure progress comes by careful and thorough investigation of the subject from the most general and fundamental researches in pure science to the narrowly limited applicational research in connection with the manufacturing process.

It was made abundantly clear that it is neither possible nor desirable to limit a special type of research to any institution or kind of institution. While purely scientific researches are ordinarily carried on in the laboratories in pure science of the universities, nevertheless they are also done, and at times need to be done, in

applied science laboratories, in research branches of Government departments, and even in laboratories of commercial firms. Similarly for applicational researches, these may be done in any institution. For example, at McGill University in an investigation of the properties of hydrogen peroxide, it was found necessary to devise and apply new and special kinds of pumps. Research being in effect in exploration and discovery, it is not possible in any given case to be sure what will be found or where it can best be found. It is of distinct advantage to have any given problem attacked in different ways, either in different types of institutions or by different types of individuals. Usually, however, it is possible to state more or less definitely where and in what way a problem can be attacked with the best prospect of success.

There was general agreement at the conference as to the great need for the Central Research Institute, planned by the Research Council. This Institute is required to do for Canada the kind of work that is accomplished in the United States by the Bureau of Standards and the Mellon Institute. In these fields Canada is quite undeveloped and dependent on foreign bounty. Fear was more or less openly expressed that the Central Institute might hinder the research work of the universities and Government departments, but it was pointed out that no such result had followed either in the United States or in other countries.

## AUTOMATIC TEMPERING OF DRILL STEEL

A mechanism for the automatic tempering of drill steel has been invented at the East Rand Proprietary Mines, South Africa, where it has been in successful use for several months past. Steel of varying carbon content loses its magnetic quality at the right temperature for quenching, and advantage is taken of this fact to quench it automatically, thus avoiding the vicissitudes incidental to tempering by hand. The drills, each in a separate tube to protect them from the gases of the heating oven, are held against a steel plate at the back of the furnace by means of powerful magnetic coils behind it. A lesser tension on the other end of each steel serves to withdraw it as soon as it loses its magnetic quality and is no longer held to the magnetised plate, this being the proper temperature for quenching. It is claimed that uniformly good tempering and a notable saving in drilling cost have been effected by this means.

## NEW PHOSPHATE DEPOSITS

Beds of phosphate of prime importance have been located in Morocco, 100 miles south of Casablanca and are now being exploited by the French colonial government as a state monopoly. During 1922, the first full year of operation of the experimental plants, 80,000 tons of prepared phosphate was shipped. The deposits cover an area 45 miles long and from three to 20 miles wide and are composed of beds of fine sand, virtually at the surface, the richer beds containing 72 to 75 per cent. phosphate of lime. The deposits thus equal in richness and rival in extent the famous phosphate beds of Florida, which at present supply half the world's annual consumption of seven million tons.

\* Professor of Biology, University of Toronto.



# Mineral Resources of Northern Ontario

By A. A. COLE\*

## COBALT SILVER DISTRICT

Most of you have a pretty good idea of what the Cobalt camp has produced in the past, so I do not intend to bore you with statistics. It will be enough to say that since the discovery of Cobalt, in the fall of 1903, the camp has produced at the rate of 2 tons of pure silver for every working day for 19 years, and at the present time is producing at the rate of 1 3-4 tons per working day. You will perhaps be more interested in knowing what the silver district is likely to produce in the future, and I am glad to have this opportunity to correct a misconception that many otherwise well-informed people entertain. I venture to state that I could find a number of men in this very room who have the idea that the Cobalt silver district is worked out, and that silver mining in this area is not worthy of any further serious consideration. Let me quote you the opinion of Cyril W. Knight, Assistant Provincial Geologist, who has recently completed the most comprehensive and at the same time detailed examination of the area. Mr. Knight says "mining will doubtless be carried on for generations either in or around Cobalt, or in the outlying areas of Gowganda, South Lorrain, Casey, Montreal River and elsewhere."

The geology of the Cobalt Silver District is much better understood now than it was in the early years of the camp's activities and as a result of careful geological work, mining development is now carried on much more scientifically than formerly. A good example of this has recently been shown in the Keeley Mine in South Lorrain. Years ago rich silver veins were discovered on the surface of this property. Money was supplied by a bank manager, but after this money was spent, with indifferent success, the mine closed down, the promotor died, the bank failed, and the bank manager went to jail. The mine was sold for a song, and lay idle for several years. A mining engineer who had faith in the property after carefully studying the geological conditions, secured an option on it for English principals. Then the war broke out and little active work was done until after the signing of the armistice. It was not until within the last two years that the careful development programme began to reap the hoped for reward. Within the last few weeks a vein was encountered which now looks as if it would surpass in size and richness, anything previously found in the district. Considering the past record of the camp, this is no small boast. In one round alone \$100,000 worth of silver was broken down by the use of \$25.00 worth of dynamite.

Properties that have been closed down are being reopened and new producers are appearing so that instead of decreasing, silver production is actually rising. Only two days ago a small high grade shipment came out from Elk Lake, the first ore from this camp for years.

Considerable revenue was also obtained by some silver mining companies from the cobalt metal contained in their ore and the high price of arsenic proved a blessing to the refiners.

## Gold Area

Travelling north from Cobalt, a part of the rich agricultural "Clay Belt" is soon entered, which is traversed by the railway for 25 miles before the gold country is entered. Two belts of sedimentary rocks are found running east and west, one to the north and the other to the south of the height-of-land, and varying from 25 to 40 miles apart. Where these sedimentary rocks have quartz-porphyrysts or feldspar-porphyrysts associated with them the conditions seem favorable for the deposition of gold. In the northerly belt the Porcupine deposits have been located on the west, with the Croesus Mine and the Lightning River area on the east of the railway. In the southern belt the most important part so far developed is the Kirkland Lake area, with Matachewan gold district on the west and Larder Lake on the east. This belt extends well over into the province of Quebec so that its total length is over 100 miles.

We cannot say that this gold country is the most important in the world, but it is significant that while the productions from all other gold countries are decreasing, Northern Ontario alone is increasing. Last year the production in gold was \$21,000,000, an increase of 40 per cent over the previous year, and this production would have been still greater had hydro-electric power development kept pace with mining development. With an adequate supply of power, which now seems assured, further increases will be shown in the future, and it is likely to be many years before the maximum production is reached. By the end of this year there will likely be some 15 gold producers. Of these, ten are Canadian controlled and financed, four American, and I English, but this latter was first brought into production by Canadians.

The production last year of the McIntyre Mine was \$2,000,000, of the Dome Mine \$4,000,000, but the greatest of all and now in fact the greatest gold mine in the world, was the Hollinger with a production of \$12,000,000. Remember that this is new wealth added to the country, a large part of which finds its way into the business of the City of Toronto. You will thus begin to realize, if you have not already found out, **that the Mining Industry is the bed rock on which the business of the Nation is founded.**

If you will think of the silver industry of the Cobalt district as having many productive years ahead of it, and the gold industry of Porcupine and Kirkland Lake (with a present production of over 25 millions annually), as being only in its infancy, we will be ready to proceed north to the town of Cochrane.

## James Bay Extension

The present northern terminus of the T. & N. O. Ry. is at Cochrane, the junction point with the Transcontinental of the Canadian National Railways. With the intention of eventually reaching a port on tide-water on James Bay, the Ontario Government has awarded a contract for a 70 mile northerly extension, and already 40 miles of steel have been laid. But you will ask, what is the object of this extension and where is the business for it to come from?

The distance from Cochrane to Moose Factory following the survey line down the valleys of the Abitibi and the Moose, is 188 miles. The country traversed may be roughly divided into two parts, the "Clay

\*Mining Engineer for the T. & N. O. Railway Commission.

\* Extracts from an address delivered at Empire Club Luncheon, Toronto, Feb. 8th, 1923.



Belt and the "Coastal Plain," with an intermediate sandy transition area of about 25 miles.

### Clay Belt

The first 70 miles north of Cochrane crosses the "Clay Belt," and as this is similar to, and in fact part of the "Clay Belt" along the Transcontinental and south along the T. & N. O. Ry. the extension of the railway northward may be considered as part of the general plan of opening up the country for agricultural settlement, for which purpose we know it is admirably suited. The "Clay Belt" is well timbered, the most abundant tree as well as the most valuable, being the spruce, suitable mostly for pulp manufacture.

### Water Powers

The water powers are an important factor. Roughly speaking, there are at present on 6 rivers between the Transcontinental and James Bay, about 600,000 undeveloped H. P. Along the T. & N. O. extension there are 3 important falls on the Abitibi River.

|                                     |         |
|-------------------------------------|---------|
| At Mileage 11 Long Sault Fall       | 65 ft.  |
| At Mileage 44 Island Portage Fall   | 55 ft.  |
| At Mileage 70 Burnt Wood Rapid Fall | 60 ft.  |
| & Abitibi Canyon Fall               | 180 ft. |
|                                     | 360 ft. |

### Coastal Plain

The "Coastal Plain" is low and swampy, sparsely timbered with a stunted growth mostly along the waterways. By placing pulp mills at strategic points, such as at the mouth of the Little Abitibi River, pulpwood might be floated down for treatment at such points. The soil may eventually be opened up for agriculture, but much drainage would be required and a top covering of a foot or so of moss or muskeg would have to be removed. Good crops can be grown, as I can testify, having seen an excellent garden at Moose Factory the first week of last September.

Although agriculture, waterpowers, and the pulp and paper industry would undoubtedly supply a considerable volume of business for a railway, these would not be the main reason for an extension to James Bay. The fisheries, and general tourist trade will be important factors; but the mining industry is likely to prove, as heretofore, by far the largest revenue producer.

### Archaean Protaxis

Now let us take an inventory of what we actually know about the northern mineral area. Take a look at the geological map of North America. The area surrounding Hudson's Bay like a great horse-shoe is known as the Archaean Protaxis, composed of pre-Cambrian rocks, the ancient back-bone of the continent. The area covered by these rocks comprises about 2,000,000 square miles, of which only a few hundred have been worked over in detail. But what are the results of this detailed work? South of Lake Superior in a southern extension of these old rocks are the vast iron deposits of the Mesabi Range and the world famous copper deposits of Michigan. Passing north into Canadian territory, we find the largest known copper-nickel deposits in the world at Sudbury. Still farther north, the silver deposits of Cobalt, and the gold of Porcupine and Kirkland Lake have already been referred to. Surely such a start should convert the worst pessimist into a most enthusiastic optimist. Let me repeat, this is the record after working over in detail a few hundred square miles of the more accessible part of a total of two million square miles. The key to most of this vast area is Hudson's Bay. With

the possible exception of Northern Siberia, this is the largest unprospected area remaining in the world. No matter what your political color, I venture to guess that no one here would prefer the present government of Siberia to that of Canada or its provinces.

### Cost of Exploration

The expenses of prospecting in this vast territory have hitherto been almost prohibitive. Apart from this, also, the time consumed in going to and from the point where exploration was to be made, was in itself so serious an obstacle that only a few government exploration parties have penetrated the interior. The result was that even with government parties, where the necessary funds were assured, the only rational method of extending the length of the exploration season, in order to make the result at all commensurate with the expenditure, was to winter in the north so as to be able to take up the work without delay as soon as the spring break-up took place. With the railway completed to a point on tide-water, such as Moose Factory, it is reasonable to suppose that small steamers will be placed on this inland sea to look after the summer coastal traffic. Such craft should be sea-worthy and of considerable carrying capacity but of shallow draft. With such small steamers making regular trips on the Bays, a party could outfit at tide-water and be at almost any coast point desired by the middle of June. The party would then have a clear four months for exploration before it would be necessary to make the return trip. The cost should not be excessive considering the facilities provided. It will require only one good discovery to start the flow of fortune seekers into this great north land, and the area to be covered is so immense that many years must necessarily elapse before the mineral possibilities can be made known, even in the barest outline.

### Prospectors

The exploration of this almost limitless Northland will be undertaken by a very different kind of prospectors from those that flocked into Cobalt in the early days. The experience gained in the Sudbury, Cobalt, Porcupine, and Kirkland Lake camps will be invaluable when pushing farther north. The Ontario Department of Mines has done excellent work in keeping well abreast of exploratory work with accurate geological reports and maps. The result is that today the average prospector has a good working knowledge of the geology of the above-mentioned districts and is keenly alive to the value of acquiring all geological information available on the district he intends to investigate. This will make exploration much more effective, as time will not be wasted in unproductive areas, and work can be concentrated where geological conditions appear favorable. The old haphazard prospector will be superseded by a trained field man, familiar with the geological formations that are likely to be most productive. The element of chance cannot of course be eliminated but it can thus be greatly reduced.

### Flying Boats

Another factor that may materially assist in the exploration of this territory is the use of flying boats for the transportation of men and supplies and also in preliminary photographic mapping and geological work. Last September I had an excellent opportunity of testing the feasibility of using a flying boat for such work. Leaving Remi Lake, which is located about 60



miles west of Cochrane, we reached Moose Factory in 3 hours and 5 minutes, a distance of about 200 miles. The next morning, leaving the Moose River, we proceeded east 30 miles along the shore of James Bay to Hannah Bay, where we turned south and followed the West river for about 50 miles to Kesagami Lake. After making an examination of this lake, we returned to Moose Factory for lunch. In the late afternoon we returned to our starting point at Remi Lake, having taken in all about 33 hours to make the round trip. Actual flying time was 11 hours, covering a distance of over 600 miles. To make the same trip by canoe would likely have taken at least 30 days.

#### Possible Rivals

The only possible rivals to the T. & N. O. in making accessible these inland seas are the Canadian Pacific Railway and the Canadian National Railways.

The C. P. R. could build a line north from the east side of Lake Temiskaming, but this would mean an extension of about 350 miles, as against another hundred for the T. & N. O. Railway, the business at the Bay would also be cut in two, so that the proposition would be that much the less attractive. Under the circumstances, we may say that if the T. & N. O. is pushed through to the Bay, the C. P. R. is not likely to parallel it at least for several years.

The Canadian National Railways has a line running down the Nelson's commonly known as the Hudson's Bay railway. This line is completed to within 100 miles of tide-water. The last 120 miles of constructed line is now out of commission through disuse, landslides and floods, so that if required it

would practically have to be rebuilt. Moreover, it is generally conceded that the harbour at the mouth of the Nelson is unsuitable and that Churchill harbour will be chosen instead. This change of terminus will lengthen the line by another 100 miles, bringing the total length of line to be constructed to over 300 miles. Churchill harbour is 750 miles north west of Moose Factory, is well north of the timber line and has a shorter summer season. (Moose Factory is 100 miles closer to Toronto than it is to Churchill). The object of building this part of the Canadian National Railways was to cut down the rail haul on grain from the northwest. Do you think that the Canadian National Railways will complete a line that will add the cost of construction of 300 miles of railway to its capital account, in order to cut down its rail haul and lessen by a corresponding amount its gross receipts? It seems to me that this leaves the field open to the Ontario Government Railway alone.

#### Conclusion

To reach tide-water on James Bay and thus make accessible the mineral resources of this vast northern heritage is to my mind the main reason for the extension of the T. & N. O. Railway to James Bay. The benefits of such an extension would not be confined to the province of Ontario, for in the opening up of the Ungava Peninsula the Province of Quebec would be greatly benefited. And would not this be a fitting method of wiping out an ancient grudge, the English province of Ontario assisting in the opening up of the French province of Quebec, to their mutual advantage and benefit?

## The John Inglis Company

EQUIPMENT AND PRODUCTS OF THIS LONG-ESTABLISHED FIRM

The John Inglis Company, Toronto, is known by its products from coast to coast of Canada. Since its operations commenced in 1860 it has been turning out boilers, pumps and engines steadily and on an increasing scale, and these are installed in every part of the country. Few Canadians realize, however, the present scope of the company's operations. The following brief description of the plant today and of some of the work that has been turned out may serve a present need.

The late John Inglis had his first shops in Guelph, Ontario, and one still runs across many a sturdy old boiler with "Guelph" on the name plate. For almost thirty years the plant has been in its present location on Strachan Avenue in Toronto, and for twenty years the firm has been incorporated under the present name.

The plant today is housed in three large, modern factory buildings and a number of smaller ones. A large new boiler shop contains plant for handling plate work of the largest dimensions. A smaller boiler shop is equipped for light plate work and for welding. The machine shop is capable of handling a great variety of work large and small. These will be described in turn, and then some of their products. This description will allow the reader to gauge the capacity, both as to range and size, of the plant.

#### Boiler Shops

The large boiler shop has two bays, each 60 feet by 400 feet, and is served by four electric overhead tra-

velling cranes of 25 tons capacity with a 30-foot lift, as well as one tower crane of like capacity with a 50-foot lift. Large plate rolls are 14'-3" wide, and a large plate planer, 36'-9" between housings. The building contains a full equipment of punches, shears, hydraulic riveters, etc., all capable of handling plate up to 1½ inch in thickness and of driving 2-inch rivets. This outline of the equipment makes it obvious that there is very little plate work, either large or heavy, required in our modern industry that cannot be handled in this shop.

The smaller boiler shop, with bays 40 feet and 30 feet wide and 300 feet long, is equipped for light tank work and small boilers. It has two overhead travelling cranes, of 25 and 10 tons capacity and 28-foot lift, in the larger bay, and five small cranes, from 2 to 10 tons capacity, in the smaller bay. Beside the regular equipment for rivetted boiler and tank work, this shop has complete equipment for electric welding and oxy-acetylene welding. There is also available a portable electric welding equipment with independent oil-driven generator for use on work that cannot be brought to the shop.

An inspection of the work in progress in this shop gives one the key to the John Inglis reputation for thorough workmanship. Every workman is a craftsman, and meticulous care is the rule, not the exception. The foremen are "on the job" with their men at all times, and prevent mistakes instead of rectifying them. The staff, from the general manager down, are conversant to a surprising degree with the detail of

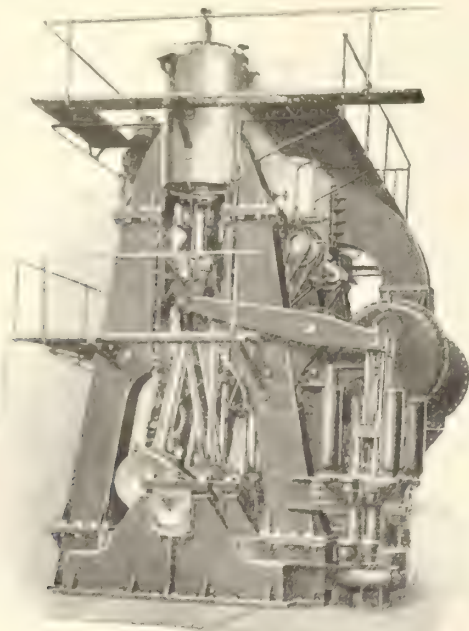


the work in hand and this of course is a very effective deterrent of shoddy work. Testing is rigid and is conducted faithfully.

### Machine Shop

The machine shop has two bays, 60 feet and 40 feet by 420 feet, the larger bay being equipped with two mechanical travelling cranes, of 25 and 15 tons capacity and 28 foot lift, and the smaller bay with one 10-ton crane with 17' 5" lift. Only the outstanding machines can be mentioned separately. A large boring mill has a swing of 16 feet diameter and is 7' 6" in height inside the housing. A large planer is 7' 8" between housings and has a table 20 feet long. If it is required to machine a piece of work too large to go inside the housing, this planer can handle it by means of an attachment. The work is fixed to surface plates in the floor, and a portable tool head is attached to the planer table, which thus machines satisfactorily the fixed piece to be worked. By this means there were machined lately both the seats and the gates of large Broome Caterpillar sluice gates for installation at the Lower Sturgeon Falls power plant on the Matagama river, near Timmins, Ontario. These gates have openings 14' 5" by 14' 6".

The largest lathe in the shop, which is really a marine engine crank-shaft lathe, has a swing of 50 inches and handles a length up to 28 feet. There is a hydraulic press for making press fits whose capacity is 300 tons.



3000 H. P. Triple Expansion Marine Engines,  
built for the 8000-ton Boats of Canadian  
Government Merchant Marine during  
1919-20-1921

The smaller machines comprise the following: 38 lathes, from 7" swing to 48"; 6 turret lathes; 4 milling machines; 3 shapers; 4 planers; 10 drills; 4 boring mills; 3 slotters; 5 grinders, and miscellaneous small machines.

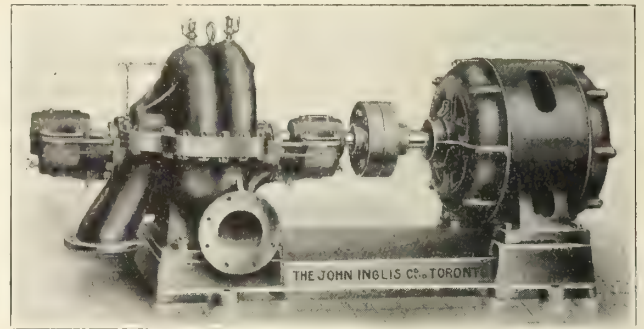
### Flange Shop, etc.

The flange shop has a capacity in accord with the rest of the plant. There are two sectional hydraulic flangers of 150-ton capacity, for flanging plates. These are equipped with special 5-ton jib cranes of 20-foot

radius, developed in this plant as no suitable design could be found ready-made. There are also two four-poster hydraulic flanging presses of 300 and 350 tons capacity respectively, for the heavier work.

The blacksmith shop has, beside the regular equipment, Acme bolt machines and a steam hammer in which small drop forgings are handled.

The power plant is compact and effective. Hydro-electric power is used whenever possible. The machines are all equipped with electric drive, individual for the larger ones and grouped in the case of the smaller machines. There are 42 a.c. motors in all, from 3 to 200 H.P. The cranes are driven by d.c. motors furnished with power from a rotary converter in the power house, which also provides current for the electric welding.

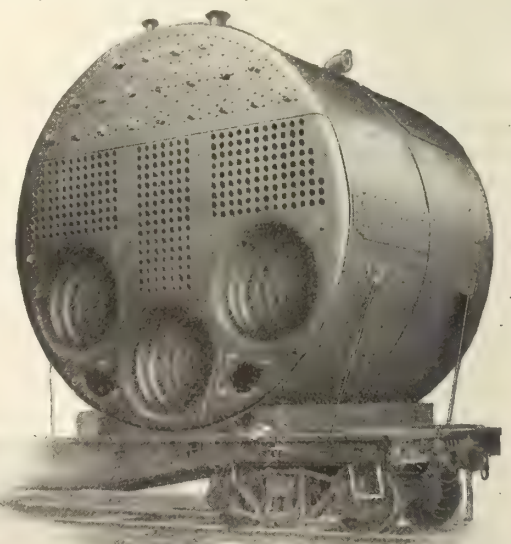


Typical Small, Direct-Connected Turbine  
Pump

Steam is raised in the boiler plant by fuel oil for the steam hammers, for testing boilers and pipes and for heating the plant.

### Typical Products

From the above description of the plant's equipment it can be seen readily that it is capable of turning out an unusually wide range of products. The firm has, however, specialized along certain lines, and a description of some typical and outstanding products of the shops will serve best to show what can be done. The range includes steam boilers of all kinds; tanks; pipes and penstocks; pumps, reciprocating and centrifugal, large and small; steam engines, reciprocating and turbine; water turbines; marine engines. There



Boiler for S. S. "Rapids Prince," 14 ft. 8 in.  
diameter and 11 ft. 6 in. long.



are special facilities for heavy and large work. Contracts are executed to the customer's design, or designs and specifications can be furnished by the company's own engineers. Recently arrangements have been made to manufacture in these shops crushing, conveying and other special machinery formerly made in the United States.

#### "Rapids Prince"

In 1910 the John Inglis Company built the steamship "Rapids Prince," sub-letting the contract for the hull. This boat is 204 feet long and is equipped with two 4-cylinder triple expansion engines of 400 H.P. each, and a Scotch boiler 14'-6" by 11'-6". A feature of the construction is that the steel plating of the hull is covered with 3-inch oak plank, as it has been found by experience that the covering of wood distributes the shock and prevents perforation of the hull when the boat touches rocks, as is liable to happen in shooting the rapids of the St. Lawrence. There is no doubt that this precautionary measure in the construction accounted for the remarkable showing of strength of the "Rapids Prince" when she grounded in the Long Sault rapids last summer.

#### Blast Furnace and Gas Producers

In 1921 the firm built for the Canadian Libbey-Owens company, of Hamilton, three Camden automatic heavy duty gas producers to make gas for use in melting glass by their new continuous process. They are 10'-6" inside diameter and 17 feet overall in height. The outer shell revolves at the rate of one turn in 26 minutes, and inside there are water-cooled stirrer bars to break up clinker. The three producers gasify a 100 tons of coal per day.

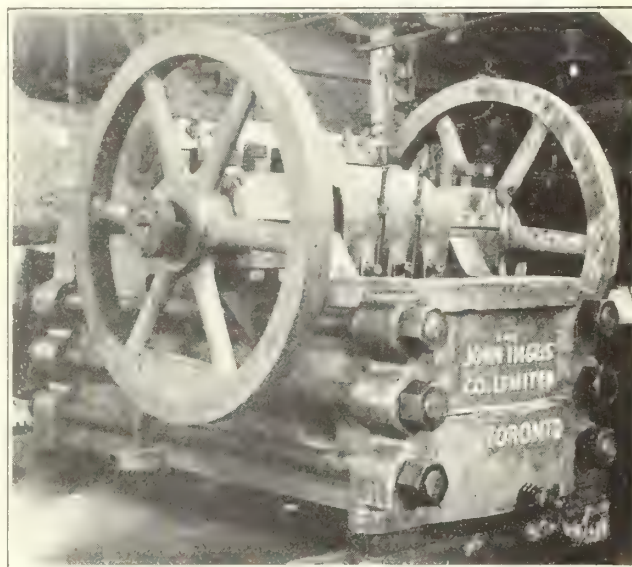
The new blast furnace of the Steel Company of Canada at Hamilton, blown in a short time ago, was constructed by the John Inglis Company. A spare bell and hopper, 12 feet maximum diameter and 9 feet high, are just now being completed. The furnace is 90 feet high and of 600 tons per day capacity. It is furnished with a McKee top. The shell is of inch plate. The iron and steel work filled 45 railway cars as sent from the shops.

The new furnace replaces a smaller one built about 15 years ago by the same firm. The original stoves are still in use. The new furnace is one of the most effective on the continent, and is of maximum effective capacity for a blast-furnace.

#### Mining Machinery

The John Inglis Company now manufacture in Canada the full line of crushing, screening and handling machinery made in the United States by Chalmers and

Williams of Chicago. Notable among these are the Symons disc crusher and the Ross grizzly feeder, each of which marks a radical change in its field and a distinct advance in the practice of reduction. They manufacture also the well-tried standard reduction machinery — B. B. gyratories, jaw crushers, crushing rolls, ball, tube and rod mills, trommels, pulsating screens, stamp batteries and accessories.



Large Heavy-duty Jaw Crusher

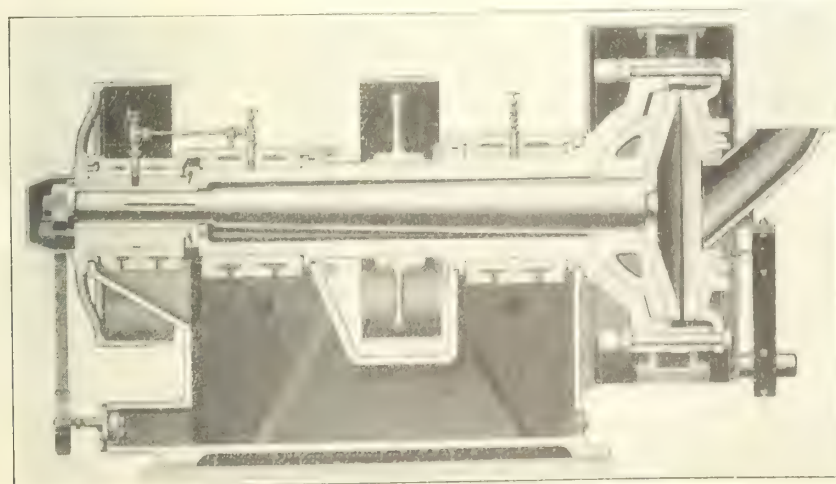
There has been incorporated recently a new subsidiary company. Webster-Inglis, Limited, to make in Canada the wide range of conveying, elevating and power transmission machinery now made by the Webster Company of Tiffin, Ohio and Chicago.

The company also has arranged to make in Canada the Wellman-Seaver-Morgan specialties, and have already made hydraulic turbines of designs developed by that well known firm.

The principal officers of the John Inglis Company are, President and General Manager, Wm. Inglis; Secretary-Treasurer, C. H. Fierheller; Superintendent, J. T. Lewis; chief engineer, George Fax.

\* \* \*

All told, the John Inglis Company, by virtue of their mechanical facilities, their capacity for fine workmanship and the lines of manufacture they are prepared to follow out, are in an exceptionally favourable position to do their part in building up Canada's iron and steel industry.



Longitudinal Section of Symons Horizontal Disc Crusher

The discs on the right revolve together at 100 r. p. m., thus providing the centrifugal force that feeds and discharges the particles of rock. The lefthand end of the horizontal shaft is mounted in an eccentric bearing, which revolves at 150 r. p. m. in a direction opposite to the discs, thus causing the discs to open and close the small distance illustrated at the rate of 250 times a minute, and so causing the effective



## COAL AND OIL

### Imported Fuel Oil Cutting Into Market For British Columbia Coal—Import Duty Suggested

"Coal vs Fuel Oil" was the subject of a recent address delivered by the Hon. Wm. Sloan, Minister of Mines for British Columbia, to his constituents in the mining town of Nanaimo, Vancouver Island. In the course of a closely reasoned speech Mr. Sloan showed that the coal mining industry of his Province has not been advancing as have other enterprises dependent upon natural resources and increasing population for their maintenance. He argued that the chief reason was the admission to Canada of foreign fuel oil practically duty free, the tariff of one half cent a gallon being inconsequential. If the coal mining industry of the Canadian West, the basis of all industrial progress, to continue in a flourishing condition he asserted it would have to be protected, either by tariff restrictions imposed by the Dominion Government or a tax imposed by the Province on oil used within the jurisdiction of its Government.

Mr Sloan's address, in part, follows:

"I have stated that British Columbia has made marked strides in point of population during the past ten years. This naturally has applied, too, to business and all related industry and forms of activity. The lumber, fishery, and associated industries, have progressed. There however is one notable exception to the rule and the exception is found in coal mining. This statement may be thought to be remarkable and by some, perhaps, it will be doubted for the moment, but I propose showing it to be correct.

#### Progress in Metal Mining

"In metalliferous mining we have gone ahead by leaps and bounds in the course of the last twenty years. To convince you it is only necessary to submit figures dealing with the output of Zinc, Lead and Copper over this period. These will show that the advance has been commensurate with the growth in population. The figures follow:

| Year | Metal  | Production      |
|------|--------|-----------------|
| 1910 | Zinc   | 4,184,000 lbs.  |
| 1922 | "      | 59,000,000 lbs. |
| 1910 | Lead   | 34,000,000 lbs. |
| 1922 | "      | 48,000,000 lbs. |
| 1900 | Copper | 10,000,000 lbs. |
| 1910 | "      | 38,000,000 lbs. |
| 1920 | "      | 45,000,000 lbs. |

"During the war, owing to intensified demand, the production of copper went as high as 65,000,000 lbs.

#### Coal Mining Stationary

"A glance at the figures with reference to coal discloses a much different story. Going back to the year 1880 it is found that the output was 250,000 tons for British Columbia. In the following ten year period the progress was satisfactory, the production for 1890 being 678,000 tons. The same may be said of the ensuing ten years, the 1900 production reaching 1,435,000 tons, or more than doubling itself. The peak was reached in 1910, the end of the next decade, when the total production for the Province was 2,800,067 tons, or again almost double the previous 10 years figures. In 1920 we find that it had dropped to 2,595,125 tons; that there was a further decline in 1921 to 2,483,995 tons, while that for the last year, 1922, stands at about the same figure, namely, 2,559,414 tons.

"I quote these statistics to show that we have not been making the headway in the coal mining industry

that would be expected, that the steady progress that would come naturally to a basic industry such as this with an increase in population and in general prosperity has been lacking and that therefore there is something wrong, and that we, who are so much interested, should bestir ourselves in the determination to locate the seat of the trouble and having found it to apply an effective cure in the shortest possible time.

#### Cheap Fuel Oil Appears

"In 1910, as I have indicated, coal production reached its highest point and it is significant that shortly after this time the importation of fuel oil began to assume



HON. Wm. SLOAN  
Minister of Mines for British Columbia

considerable proportions into this Province. A tax of one-half cent a gallon was placed on fuel oil imported to Canada in 1916. I would point out here that the coal output in the year 1915 in British Columbia was only 1,611,129 tons, a very serious drop as against the 2,800,067 tons of five years before.

"The duty of one-half a cent on fuel oil I maintain has never been effective. While the price of such oil in the Province has fluctuated it never attained the point that permitted coal to enter into competition with it on anything like even terms until 1920-21, which period marked a greater advance in local quotations than any of which we have record. Now, once again, owing to the opening up of new wells and to the comparative slackness of foreign markets outside the continent of America, it is back at about \$1.25 a bbl. Estimating 4 bbls. as being the equal of a ton of coal, this means five dollars a ton coal. When we place this figure against the quotations on coal at world market bunkering centres the seriousness of the matter strikes



home. At New York on November 4, 1922, coal was quoted at \$7.90 and \$8.15 a ton; at Philadelphia at \$7.65 and \$8.15; at Hampden Roads at \$7.15; at Cardiff, Wales at 28s, or \$6.44 and 29s, or \$6.67; at Newcastle, Eng., at 27s, or \$6.21. Present prices at Vancouver Island ports are \$6.60 and \$7.00.

#### Higher Import Duty Proposed

"I may say further that the amount of fuel oil imported into this Province means the displacing of some 90,000 tons of coal a month on our markets. This is almost 75 per cent. of the present monthly production of the Vancouver Island Collieries. In other words, if there were no fuel oil the coal mines of this Province would be called upon to produce over a million tons of coal more than at present per annum. It needs no stretch of imagination to realize the results. There would be no slack times, the mines would be operating at capacity throughout the year, the coal fields would be developed on a larger scale than at present, employment would be increased, the payrolls would be larger, the currency circulated in our mining centres would be increased, prosperity would grow, not only in the colliery districts, but would radiate throughout every line of industrial endeavour having an effect in every community and in every section of the Province.

"And what has the one-half a cent a gallon duty accomplished? If it was intended to protect the industries with which the Fuel Oil competes it has failed miserably in British Columbia. If it was intended to materially swell the federal exchequer it has not registered a very complete success. The Dominion Government has collected in British Columbia through this one-half a cent duty since its imposition in 1916 — over six years — the sum of \$2,916,000 while in the last year, 1922, the income from this source was \$505,000. It may be said that this is not a mean sum. Considered alone, perhaps not. When placed alongside the revenue requirements of the Dominion and the possibilities of the duty if applied to really protect our coal mining industry, its insignificance becomes clear. A material increase in this duty! — that to my mind is the solution, that is the cure of the disease with which the coal mining industry of our Island is afflicted."

Continuing, Mr. Sloan pointed to the fact that the 53 cents a ton duty now imposed by the Fordney tariff, which is operating to check the export of coal from the Crow's Nest Pass and other collieries, is directly due to the 53 cents a ton duty levied on American coal as a protection to Nova Scotian collieries. Thus the West, he argued, is made to foot the bill for the East.

After alluding to the success of negotiations with the Dominion Government with respect to using Canadian coal on the vessels of the Canadian Government Merchant Marine, Mr. Sloan pledged himself to do all in his power to bring into effect an import duty, either federal or provincial, on fuel oil as a means of stimulating home production of coal.

#### LETTERS FROM READERS

##### Madagascar Graphite

To the Editor,

Canadian Mining Journal.

Sir:—

In your issue of the 16th inst., I note a letter from Mr. F. C. C. Lynch, of the Natural Resources Intelligence Service, Ottawa, relative to Madagascar graphite. It is possible that both Mr. Lynch's informant and myself have made slight errors or omissions.

My statement as to the unsuitability of Madagascar graphite for crucible making referred rather to the

United States, our logical market, than to the world generally though I still think the statement good. Unfortunately a great many of my data are in Toronto and I cannot, without loss of time, provide all the proof necessary to make my statement good at the present writing.

In a confidential report, printed for the Committee on Ways and Means, Washington, 1919, the statement is made:

"Recently, the French island of Madagascar has come forward as a rival producer of crystalline material. The quality of the product is a little different from that of Ceylon. *It is not satisfactory to domestic crucible makers, but is preferred abroad because of its low price*". (The italics are mine.)

Henry G. Ferguson, United States Geological Survey, "Graphite in 1917", says: "American crucible manufacturers prefer the Ceylon graphite to other grades".

Mr. Lynch says: "it (Madagascar) is being used in preference to Ceylon graphite owing to its better quality and grade". I have not the imports of Ceylon and Madagascar graphite into Great Britain for late years but am able to quote the value, per ton, of the imports into the United States from the two countries for the post-war years of 1919, 1920 and 1921 and they are illustrative:

| Year | Ceylon   | Madagascar |
|------|----------|------------|
| 1919 | \$161.90 | \$120.35   |
| 1920 | 117.05   | 60.80      |
| 1921 | 86.30    | 62.60      |

As the Ceylon material is crude and requires expensive milling while the Madagascar stock is finished and supposedly ready for the crucible maker it seems strange to me that the material of "better quality and grade" is so much the cheaper. It cannot be by reason of exchange as the Madagascar producers are, I suppose, business men and would rather take advantage of it.

Mr. Charles Pettinos, New York, one of the largest importers of both Ceylon and Madagascar graphite, writing of Madagascar in "Graphite in 1291", United States Geological Survey, says: "There are large stocks in Madagascar, France, England and America. It will be absorbed much more slowly than the Ceylon stocks".

Again, if the Madagascar material is "better in quality and grade", why is this?

For obvious reasons I cannot give the names of my informants here though I will gladly put the Intelligence Service in touch with them when they will find that insofar as the United States crucible makers are concerned, Madagascar graphite is eminently unsatisfactory. With few exceptions I know all the crucible makers on the Continent, more or less intimately, and they all condemn Madagascar graphite to me as being unsuitable because of the lack of uniformity, though not necessarily of carbon content. They find that, in the same batch of pots, one or more are very good and the rest are exceptionally poor.

While I naturally resent the last paragraph of Mr. Lynch's letter, wherein he says I am disseminating information "detrimental to the development of Canadian resources", I probably have to thank him for publicly bringing up the question. I will, with your permission, in the near future take pains to prove my point and at the same time enlighten the Natural Resources Intelligence Service, Ottawa.

H. P. H. Brumell.

Professors Carter and Hevesy of Copenhagen University have discovered in certain zirconium minerals a new element, much like zirconium, which they have



# Mine Timber

By J. A. McMASTER \*

The proper utilization of structural wood in the mining industry is an economic necessity. For too long a period, the writer believes, the buying of timber has been accomplished after merely consultation with a handbook showing comparative strengths. This is ideal for steel, but it is to be remembered that the weakness of timber is not generally in its inability to withstand a load but rather to resist decay. Most of the technical writing on timber deals with timber design rather than with the most desirable timber for use underground or for mill construction. This paper deals with the quality of mine timber, with application chiefly to Ontario.

## Spruce the Best Mine Timber

The initial stage of a mining property in Ontario sees the local round timber in use. Spruce is generally conceded to be the premier mine timber. Here, spruce is taken to include both the black and white varieties as they are rarely to be had separately. Both black and white spruce are found in the four eastern provinces growing side by side, similarly to red and white pine. No differences exist in the colour of the woods and, neglecting differences in bark, the chief distinction is that black spruce has a closer texture, indicative of greater strength, and has fewer loose black knots than the white spruce. This comparison is of interest as Nova Scotian coal companies used to require that 9 ft. props be of black spruce (and six inches in diameter at end.)

## Fir Principally Used

The answer to, "What timber shall we use?" would be more easily answered if Ontario's supply of spruce was as endless as fir is in British Columbia. The eastern supply of spruce together with all large timbers is very limited and the large sizes needed for mining supports are not available. Twelve-inch or larger round spruce is not procurable in quantity, hence the supplanting to-day of the round timber by squared manufactured stock from British Columbia.

According to Storms in "Mine Timbering," spruce is the choice of mine timber. Second place he gives to Oregon pine. Oregon pine and Douglas fir are synonymous terms. Douglas fir is available to order in practically any size and is stocked in sizes up to 24" x 24", and even lengths between 30 and 40 feet. Recently the Hollinger Consolidated has replaced spruce stulls by 12" x 18" fir sticks. The mines at Sudbury have used fir timbers for some time, Creighton standardizing on 12" x 12" with 6" x 8" in chutes. This adopting of standard sizes is commendable. The near future will likely see the Kirkland Lake and smaller camps using fir.

Fir timber will likely supply the mining market for the next decade and the vast forest reserves of British Columbia should be able to maintain the enormous demands with but slight advances in cost. Fir laid down in Ontario costs about \$50. per thousand feet. It is well to remember that one-half the cost of this product is freight and that this may be minimized by specifying (if your order can thus be placed) well seasoned or bone-dry stock. In the pur-

chase of timbers it is considered good practice by lumber concerns to establish a trade with a tried sawyer for the supply of straight-edged, properly dimensioned timber and to retain this connection. This should apply equally to mines. The vast difference in the product of one mill over another is the reason for advocating this policy. This brings forth the point that the initial cost is not the sound basis of valuating mine timber.

## Density the Best Guide

Specifications often call for "virgin growth", or second growth timber, yet the terms are without fixed significance, and material cannot be positively identified as belonging to one class or the other. "Virgin" or first growth means timber that grew up in a standing forest under conditions of active competition for sunlight and moisture. "Second growth" when applied to a forest stand usually means timber whose main growing period occurred under lessened competition after all or a portion of the original stand had been removed by cutting, fire, wind, or other agencies. In general "second growth" is associated with the idea of a second crop of timber. Virgin timber is the slow-growing timber while second growth, due to more favorable conditions, is relatively rapid. A faster rate of growth is evidenced by wider annual rings. These indicate stronger and tougher wood in the hardwoods, such as ash, hickory, elm and oak, but weaker and "brashy" wood in the conifers. Hence for strength, second growth is sought in hardwoods and virgin growth in the soft woods. As a second growth forest attains maturity, the rate of growth slows up and the annual rings may be no wider than in virgin growth of the same size. On the other hand, when a slow-growing, suppressed forest tree is freed by removing the neighboring trees it may grow rapidly for a long period. Therefore it is possible to have some wood with the characteristics of virgin growth and some with those of second growth in the same tree. Hence, strictly speaking, it would be better to disregard rate of growth and rely upon density as a guide to quality. Density is usually governed by a specification of the number of annual rings to the inch.

## Pine Timber

One of the chief reasons why spruce and fir stand out as mine timbers is because the sapwood and heartwood of these trees are about equally durable. This is not the case with the pines, as evidenced in the very sappy short-leaf or loblolly pines. It is worth while to explain here how to detect short-leaf pine from long-leaf pine, when this is possible. The latter is the hardest softwood and makes an ideal mill construction timber, and while not as desirable as spruce or fir for underground use, it may be used. Long-leaf pine will enter more and more into competition with fir in regard to cost, particularly in the smaller sizes. Short-leaf pine should not be used for any construction work without previous preservative treatment; but, strange to say, in squared timber it is not possible to determine visually one from the other. The strength of long-leaf pine depends upon the fact that it is a slow-growing tree compared with short-leaf pine, which sprouts up quickly. Hence long-leaf pine usually has the annual rings close together. In

\* Student in Mining Engineering, University of Toronto. Essay submitted to fulfil requirement of final year.



round timber it is possible to detect long-leaf pine by the diameter of the pith, that is, the core in the centre of the tree. If the pith is less in diameter than 0.1 inch, the material is long-leaf pine. To insure the purchase of long-leaf pine in manufactured timber, deal with a strictly long-leaf mill, such as Long Bell; avoid bargain sales by unknown companies. In small lots a safeguard is to specify the number of lines to the inch. This is generally placed at three to the inch.

### Rotting of Timbers

The life of timbers is very much affected by conditions in the mine such as whether it is wet, dry, damp, warm, cold; well ventilated and so on. This can be illustrated from personal observation at the Hollinger. Timber in the shafts and around the underground stations appeared to be in good condition. This location was continually wet, and in such a place fir or spruce will last indefinitely. In the main drifts where a constant supply of cool, fresh air passes constantly the timbers were not affected by dry rot or fungus; but in the crosscuts, particularly in the upper, older section of the mine where fewer raises exist and consequently fresh air is scarce, fungus had attacked the timbers and the further in from the drifts one went the more diseased timber was found. It was noticed that those stulls from which the bark had been peeled either deliberately or during the timbering, were relatively free of fungus. This is because the space between the bark and sapwood is a favorable place for fungus to grow. It is, then, at those sections where there is warm, damp, non-circulating air that greatest care in the selection of timber should be taken. It is conceded that uniformity in the system of timbering a mine should be adopted; but it does not follow that one grade should be used throughout. At the points where decay is the more likely, preserved timber or the best stocks available, properly seasoned and peeled, should be used.

### Care of Timbers

To season, timbers should be stacked for four summer months. This should give the timber the proper strength and endurance for mine use. Very often wet timber is placed in close piles where the circulation of air is prevented, and as the bark is continually wet we have the most favourable conditions for fungoid growth. With round shoot logs, stulls, or lagging, piles should be built in a crib fashion, using two to three logs as horizontal crosses every other tier. With squared timber, piles should be built on bottoms, the front of which should be slightly higher than the rear. Spaces should be left laterally between the timbers and if the material is not too heavy, cross timbers used. Where possible, cover with 1 inch culls. Such a pile should drain readily and the drying process will be very efficient and rapid. Creighton is one mine where shoot logs have been peeled and seasoned to good effect.

Fungus growth on timber is not in every case made up of fibre-destroying organisms, yet the appearance of fungus is to be regarded as evidence of the first stage of decay, as conditions that promote the growth of molds, blue stain fungus, and other non-injurious molds are usually favorable to the growth of the wood destroyers. Antiseptic treatment against these growths has been tried with fair success. Some of the chemicals used are sodium fluoride, borax, soda and cement, or the commercial product "gunite." The last, which is coming much into favour, is sprayed

on with a gun. Antiseptics in many cases are of little use, as decay is going on in places not exposed. Hence, pre-treatment of wood for these places should have been resorted to.

### Preservative Treatment

Four wood preservation processes are in use, and their respective adoption is based entirely on the increase of life of timber that is required, this increase being proportional to the degree of penetration of the preservative. These methods are:

- (1) By spraying
- (2) By painting
- (3) By open tank treatment.
- (4) By pressure treatment.

As a working basis, the life of untreated timber may be taken as 4 years. Methods 1 and 2 are said to give an increase of 2 to 5 years to timber; method 3, an increase of 5 to 10 years and the fourth increases the timber's life indefinitely. The cost of creosoting varies with every case and is dependent on the extent to which the treatment by any method is carried. Creosoting costs are not readily obtainable in Canada. A resumé of statistics in American practise places labour charges at \$2 per thousand feet. The labour need not be skilled for this work. In the open tank treatment, which is the more generally practised, the consumption of creosote is about 0.5 lb. per cubic foot. Creosote at 16c a lb. brings this to \$6.00 per thousand feet, or a total of approximately \$8.00, varying with conditions.

The practise of the Philadelphia and Reading Coal and Iron Co. is notable. Creosoting was first used by this Company in 1907 at Silver Creek mine using the open tank method and crude zinc chloride as the adsorbent. In 1909 they discarded this method for the more thorough treatment by pressure, and a plant was built for this purpose. More recent development at this property saw the replacement of zinc chloride by silicon fluoride which is slightly less costly and for treatment with which but 0.3 lb. of preservative is used per cubic foot. It is claimed to have a greater toxic effect than creosote. A preservative should be fire-resistant. Creosote may be so, but it brings in the alternative evil of fumes in case of fire. The coal industry has in general applied preservative treatment more than the metal mines and the above illustration is significant in that it shows how the use of pre-treatment has grown as it proved economical in that industry.

Sapwood will absorb preservative to a greater depth by dipping than will heartwood, and for this reason round timbers are preferable for creosoting to squared. Jack, loblolly or short-leaf pine, relatively cheap varieties of timber, lend themselves to preservative treatment as well, if not better than, fir or spruce. Costs of preserving dry timbers are much less than with green stock as it takes less time and it is easier to replace air in the outer cells than moisture. To pre-treat green timbers, slow pressure treatment has of necessity to be resorted to for good results. Many mines have begun actively the "drawing" of mine timbers from worked-out sections of the mine. After seeing some of these salvaged timbers and comparing them with creosoted piles resurrected near Niagara Falls, the obvious conclusion was that for this to be an economic policy, pre-treatment in the first place is necessary.

So far these remarks have applied more to timber than to planking. The use of 2 or 3 inch plank wider



than 10" or 12" practically means the use of western fir. It might be well to state why such plank from the west on delivery is less in thickness than the even inch called for. A rough joist 2 inches thick from the east will stand up to 2 inches by the Ontario standard. The Western standard is  $1\frac{3}{4}$ " and they base their sales on this. Plank from the west are shipped sliced or planed to this even thickness. Plans should conform to this to avoid extra cost. For planking of smaller sizes, local spruce, various pines and a limited supply of tamarack is available. A good lumberman's rule or axiom regarding grade of plank is "When in doubt use good white pine." Creighton mine in 1920 was using a considerable amount of 2" x 10" white pine, No. 1 box or common, to a dressing grade. Lately the market has seen an influx of jackpine and spruce, mixed, from the far north and east. Most of this jackpine is saturated with "red horse" streak, which on drying turns to dry rot. This can be bought cheaper than hemlock in sizes 2" x 4" and 2" x 6" and may find a limited use in wet places or by virtue of pre-treatment, in mills, or underground as plank between rails, etc.

#### Tips for Buyers and Users

Selling experience in lumber permits me to say that money often could be saved a buyer if he were made conversant with the available stocks as they are to-day, rather than as they were where he last made inquiry. Such neglect on the part of buyers may cost money, as it is not always the aim of a salesman merely to unload stock. With this point in mind I may say that the overhead cost of handling plank could well be reduced by the use of planing-mill machined lumber. The cost is not large, not more than \$2 per thousand feet. The reduction in freight often would repay this. For instance, a shaft now wet could be made water-tight by the use of shiplap or plank grooved for a hardwood spline. The latter would make a shaft practically proof against leakage while the former is so readily laid that why it has not been universally used, I am at a loss to know. The

side exposed most to weathering need not be dressed. This use of shiplap would insure a finished job in shaft timbering that is lacking to-day, at practically no additional cost. In fact, I believe that laying the plank would be so simplified that a net saving would result. Most mines have as an adjunct a small wood and timber shop. The installation of a planing mill and timber machinery is wholly dependent upon the size of the property. As the machines run only now and then, they often do not mean a business return and are merely for handy use. The buying of lumber already manufactured should be more economical.

#### Specifications for B. C. Mine Timber

The following grading of mine timber is given by the British Columbia Lumber & Shingle Manufacturers, Limited: No. 1 Fir mine timber to be free of serious shakes, splits, or rot. Will allow variations in sawing, sap stain, solid heart, and stain extending over not more than half of piece. Permits large knots and a few well scattered worm holes and wane, 3 inches on one corner or its equivalent on two or more corners. Will admit 15 per cent hemlock.

This specification appears loose and has been, I should say made by lumber men rather than by mining men. One point, the inclusion of solid or box heart, is noteworthy, as this is really desirable for mine timber. The greater part of construction timber is later resawn by planing mills and for this purpose quartered sticks are preferable. But where sticks are used whole, as in mining, the box heart has many good features. Besides its strength, it minimizes the number of timbers having slashes off their edges. The establishment of trade with reliable firm permits them to sort such sticks for mine use, to a specification.

In conclusion, it may appear that I am pushing economy beyond practical limits in the matter of timber; but, the utter lack of a sense of value shown by most mining men when buying lumber prompts me to say that if they will pay more attention to these and kindred details, it will prove of great benefit both in economy and in general mine maintenance.

## News and Comments

BY ALEXANDER GRAY

### WRIGHT-HARGREAVES IN 1922

It is no disparagement of other producing gold mines of Northern Ontario, to attach exceptional interest to Wright-Hargreaves Mines and their economical plant. Harry S. Denny, C. B. E., M. I. M. M., of London, South Africa, Australia, Mexico and at large, during his recent flying survey of the North Country, formed the opinion held by those most familiar with Ontario mines and mills, that the Wright-Hargreaves has combined efficiency and simplified milling methods comparable with the best.

If the slightest criticism has to be lodged against Wright-Hargreaves costs, it applies to the inevitable administration and Management item: \$0.540 per ton upon the small tonnage milled. Otherwise the operating charges are well balanced, the total of \$6.317 per ton milled conveying its own commendation of the management. That cost includes extensive Development and Exploration, Depreciation of Plant and Equipment. Apart from General and Undistributed Charges, the per ton milled cost was \$4.85. It is comprehensible,

therefore, why President Cabana was glowingly complimentary when he wrote:

"We have a most excellent plant and outfit. The construction work is all of the best, and as I reflect upon the progress of the development of our property and the erection of our mills and other buildings, I cannot see that a single mistake of consequence has been made, and that with the exception of some very minor details and adjustments, the mill is not only treating ore up to our expectations, but is exceeding them as previously indicated".

This, by way of retrospect, is reinforced by the further forewords of President Cabana:

"As we proceed in our operations and in the development of our property, I believe it will soon be necessary for your Directors to give consideration to the matter of increasing our mill to about double its present capacity, but this can better be determined after we reach the 1000-foot level in our present sinking operation".

Without dilating on the mining position, the manner



in which Mr. Cabana disposed of the company's plans for expansion is an exhibition of confidence awaiting verification. Such anticipations as Mr. Cabana indulges in bespeak continuance of the trust vested in the administration and management. It is almost a matter of mere petty cash to specify the cost of administration where there is manifestly scrupulous and capable control.

General Manager Wende has earned the respect entertained for him by all who know what he has constructed upon a foundation more experienced builders would not risk. With the Wright-Hargreaves and Sylvanite, he and his colleagues have the basis for greater doings. Were it not for this, something might be sought in the shape of estimated ore reserves.

Shareholders may trust their speculative investments with executives who have a model enterprise of its kind and who declare it to be their policy "to distribute all free surplus after making ample reserves for depreciation and depletion". Against current assets of \$274,125.44 on December 31st., the current liabilities were \$108,414.02. The balance of \$6,423.87 to the credit of free surplus has a working capital offset of sufficient in cash and cash assets for the purposes of the company. That the mining and exploration position is being protected, is indicated by the summary of development and exploration—

|                       | Shaft<br>Drifting<br>Feet | Cross-<br>Sinking,<br>Feet | Diamond<br>Cutting,<br>Feet | Diamond<br>Drilling,<br>Feet |
|-----------------------|---------------------------|----------------------------|-----------------------------|------------------------------|
| In Fiscal Year, 1922  | 2548                      | 445                        | 310                         | 827                          |
| To December 31, 1921  | 3315                      | 1155                       | 368                         |                              |
| Total at December 31, | 5863                      | 1600                       | 678                         | 827                          |

Of the 1922 development and exploration cost, amounting to \$86,095.27, and its relationship to the bullion production, it is to be noted that the total of preliminary cost development is written down to \$200,834.83. Most of the drifting during the year, was done on the 400 and 500-foot levels, and Mr. Wende reports that over three fourths of this, or 2977 feet, was in ore. Besides this No. 3 shaft was carried down from 420 to 865 feet, and stations cut at the 550,700 and 850-foot levels, together with the provision of a sump and pumping facilities at the 700-foot level.

Precedence is given to the work underground, because the present situation is so satisfactory that it is more to the point to follow new development and the implied promise of the President as to the larger mill. The present mill had an estimated capacity of 160 to 175 tons per day, whereas it averaged last year 205 tons, with a surprisingly small crew. Had it not been shut down for repairs and a power failure in October on account of the bush fire, the tonnage treated would have made an even better showing. As it was, the mill ran 88.31 per cent. of the possible running time, treating 66,181 tons for a gross yield of \$762,752.84, the average grade being \$11.52, the net profit per ton over all being \$5.20. On the current milling basis there was six months' broken ore supply on December 31st. With a larger mill, the ratio of profit ought to be increased. Meanwhile \$412,500 was distributed in 1922, and \$68,750 in Jan. 1923.

### ASBESTOS CORPORATION OF CANADA

The Eleventh Annual Report of Asbestos Corporation of Canada for the year ended December 31st. contains nothing to create misgivings in the minds of shareholders and conveys concrete information as to the financial position and prospects. Complacency is engendered by this statement:

|                                                    |                |                       |  |
|----------------------------------------------------|----------------|-----------------------|--|
| Investments:                                       |                |                       |  |
| Dominion Government Bonds ..                       | \$1,354,861.66 |                       |  |
| Company's Own Bonds and other Securities ..        | 853,624.66     | \$2,208,486.32        |  |
| Current Assets:                                    |                |                       |  |
| Inventories of Asbestos, Materials and Supplies .. | \$836,747.09   |                       |  |
| Accounts and Bills Receivable ..                   | 318,327.71     |                       |  |
| Cash ..                                            | 451,875.78     | 1,606,952.58          |  |
| Deferred Charges to Operations ..                  |                | 32,345.26             |  |
|                                                    |                | <u>\$3,847,784.15</u> |  |
| Current Liabilities:                               |                |                       |  |
| Accounts Payable and Payrolls ..                   | \$131,490.92   |                       |  |
| Accrued Liabilities ..                             | 2,513.61       |                       |  |
| Dividend Payable Jan. 13, 1923 ..                  | 115,000.00     | \$249,004.53          |  |
| Reserves:                                          |                |                       |  |
| For Contingencies & Gov. Taxes                     |                | 227,157.74            |  |
| Surplus:                                           |                |                       |  |
| As per Statement Attached ..                       |                | 2,211,076.94          |  |

A liquid position of that sort at the end of a period of trade adversity and international cross-purposes provides nothing more lugubrious than this, which is incorporated in a review of the history of the Asbestos Industry:

"Like all industries, the Asbestos Industry suffered a depression after the War, and during the past year the demand has been quiet, in spite of the drastic cut in prices, especially in the higher quality of grades, which had to meet Rhodesian competition as well as the small demand for this quality of material. In the lower grades, in which Canada stands pre-eminent, indications of a better demand are in sight, though prices are much below war prices. The European demand, which prior to the War purchased about 40 per cent. of Canada's output of all grades, is naturally very much curtailed, but in time the export business to Europe should improve, and given a sympathetic help from the Quebec Government, instead of a drastic short-sighted policy of taxation, the Asbestos Industry will eventually come into its own.

"Asbestos is supplied principally from Canada, Rhodesia, South Africa, the United States and Russia. The output of Canada more than equals the rest of the countries, and the quality of its higher grades is unexcelled."

Net working capital being \$3,517,316.77, the outlook being somewhat clearer, "all mines and mills are running at full day shifts."

Profits from last year's operations, after providing for Government Taxes, but before making provision for Exhaustion of Minerals, amounted to \$756,644.69, as against \$727,093.74. To this, \$136,414.08, the interest on investments and bank balances, was added, making the total \$893,058.77. After deducting for Bond Interest, Exhaustion and Depreciation, the net profits were \$543,258.63. This was ample to cover dividends on the Preferred and Common Stock issues and leave a surplus for the year, of \$83,258.63.

President W. D. Ross submits that the results "should be considered fairly satisfactory." Of the outlook, Mr. Ross says:

"Renewed building and commercial activities in the United States have been felt in the Asbestos Industry, and the demand for your Company's products has been greater than for the last two years. Offsetting this, however, has been the curtailed shipments to Europe, more especially to Germany."



During the year the stripping of ground at the King's Hill was continued, over 134,000 cubic yards having been removed, greatly enlarging this important pit and placing the Company in a position to increase its output when conditions warrant it. In connection with this property, plans have been carefully studied with a view to the erection of an additional Mill of 1,200 tons capacity per shift, which, when fully completed, will be nearly double that of the present mill. It is expected, with the experience gained in the past, the process of manufacture will be improved and economies result from the same."

### OPPORTUNITY IN SASKATCHEWAN CLAYS\*

The attention of those interested in Canadian raw materials for clay product industries in Canada has for many years been directed to the extensive clay belt known to extend over a wide area along the Weyburn Branch of the Canadian Pacific Railway in Southern Saskatchewan.

Owing to the nature of the clays in this field and their convenient situation as regards transportation, it has frequently been predicted that Saskatchewan will eventually take up an important industrial position in the Dominion based on industries utilizing clays, coals and natural gas.

Data on the Saskatchewan clay deposits has until recently been somewhat general, but steps have lately been taken to acquire more specific knowledge of the various beds, their suitability for a variety of clay products, and accurate investigations have been made with the ultimate object of placing before those interested such information as may lead to practical development.

A course at ceramics was instituted at the University of Saskatchewan to ensure a staff of experts for the future industry and a ceramic engineer secured who had a wide practical as well as theoretical experience. Private prospecting has supplemented government efforts, and to-day reliable information on the Saskatchewan clay deposits is so extensive and at the same time so encouraging as to warrant the closest attention from manufacturers and investors.

#### Readlyn-Willows and Eastend-Ravenscrag Deposits

So far the surveys carried out by the Province's Ceramic Engineer have resulted in concentrating attention on the deposits in the Readlyn-Willows and Eastend-Ravenscrag districts, these surveys having disclosed in these territories very large deposits of commercial clays. There are present in the district clays of a wide range of physical properties which permit of close control in body mixtures. In the immediate vicinity of Eastend there are at least two large deposits, easy of inspection, from which not only tests have been made, but many carloads shipped to Medicine Hat, Alberta, and manufactured into creditable and extensive lines of crockery and stoneware for the Eastern Canadian market.

In the Readlyn-Willows district the clays have been found to be of the ball or semi-ball types burning nearly white. In some cases a creamy white burning clay was found much lighter than similar commercial clays of Great Britain and the United States. These clays should form the basis for the manufacture of such lines as granite ware, floor and wall tile, insulators and similar ware where a white body is desired. There is also to be found in this district clays of the

stoneware type as well as semi-refractories suitable for screw-pipes, terra-cotta, enamelware and ordinary fire brick and stove linings. In the Eastend-Ravenscrag district the clays are of the earthenware and stoneware types, highly suited to the manufacture of Rockingham yellow ware and a wide range of stoneware, including chemical.

### Excellent Transportation Facilities

These two Saskatchewan clay deposits are arousing particular interest at the present time owing to the recent completion of the railway from Weyburn, Sask., to Lethbridge, Alberta, thus providing the final link in the transportation chain between these points. These deposits, which lie close to the railway line and not very far from the international border in South-Eastern Saskatchewan, are now provided with excellent transportation facilities. The Readlyn-Willows deposit is, in addition, within relatively short distance of the Souris coal fields, and the Eastend-Ravenscrag deposit in addition to being well located in the matter of a supply of pure water, is in close proximity to the great semi-bituminous coal fields of Southern Alberta. The completion of the railway line would seem to remove the one possible handicap to the exploitation of these deposits, and the many advantages should now render their development attractive investments.

The establishment of an extensive clay products industry in the Province of Saskatchewan in the not distant future, can be reasonably expected. Excellent clay deposits of every variety are available, with fine transportation facilities and in proximity to supplies of coal and other requisite materials for manufacture. These clays have been proven the equal of deposits anywhere, and exhaustive tests made in the ceramic laboratories of New York all gave eminently satisfactory results.

Saskatchewan is the logical home for such an industry in Canada. There is a constantly growing market for building material such as brick, tile and terra-cotta and great market possibilities for stoneware and even table ware. The Province of Saskatchewan alone imports heavily of these commodities each year. The existing industry in Canada is totally inadequate to supplying domestic requirements, and in the last fiscal year the Dominion imported clay products to the extent of \$10,781,592 as well as clays of various kinds to the extent of \$672,782, and such importation is on the increase rather than otherwise. Certainly there is a splendid opportunity for the investment of capital in the clay-working industry in Saskatchewan.

Due to high wages and short hours in the coal mines, high railway rates, and high wages in the iron mines and at iron and steel works, the steel trade of Britain is in a precarious condition. The cost of coal is 77 per cent above that of 1913 and railway charges are up 73 percent, whereas the present price of steel is only 13 percent in advance of 1913. The production of pig-iron in 1922 was 4,000,000 tons, against 2,600,000 tons in 1921 and 10,000,000 tons in 1913.

Sulphur is one of the very few commodities that is cheaper now than before the war. This is wholly due to the production by the Frasch method with hot water from the sulphur "domes" of Louisiana and Texas. The companies operating there are searching continuously for new uses for their sulphur, since the possible output of their deposits is much larger than the present demand.

\* From Agricultural and Industrial Progress in Canada.



# The Mining Districts

BY THE JOURNAL'S CORRESPONDENTS

## BRITISH COLUMBIA

**PORTLAND CANAL.**—An examination of the Fish Creek Portland Canal District properties of the American Mining & Milling Co. has been made by G. T. Jackson, formerly manager of the Alaska-Gastineau mine at Juneau, Alaska. Mr. Jackson was accompanied by W. R. Tonkin, vice-president of the Company. He is quoted as stating that these mineral claims should be developed by means of a longeross-cut tunnel, the ore being brought to the wagon road by tramway. The tunnel proposed will be between 1400 and 1500 feet in length, cutting at depth the entire vein system. The tram line has been surveyed and sites obtained for the terminals. A location also has been selected for a concentrating mill it is proposed to instal.

**TRAIL ORE RECEIPTS.**—Ore shipments to the Trail Smelter, Canadian Consolidated Mining and Smelting Co., for the week ending February 14th totaled 8096 tons. Three new 1923 shippers were the Ruth, Sandon; the Standard, Silverton; and the Nip and Tuck, Windermere. Following are the detailed shipments for the week:

| Mine                      | Tonnage |
|---------------------------|---------|
| Black Rock, Northport Wn. | 42      |
| Bosum, Silverton          | 32      |
| Company mines             | 6983    |
| Knob Hill, Republic Wn.   | 164     |
| Lone Pine, Republic Wn.   | 323     |
| Nip and Tuck, Windermere  | 30      |
| Paradise, Windermere      | 46      |
| Quilp, Republic Wn.       | 55      |
| Ruth, Sandon              | 40      |
| Silversmith, Sandon       | 237     |
| Standard, Silverton       | 81      |
| Steel Gp., Brisco         | 34      |
| Surprise, Republic Wn.    | 103     |

8096

**TELKWA.**—The Dome Mountain Mines, near Telkwa on the Grand Trunk Pacific Ry., are reported to have been acquired by the Federal Mining & Smelting Co., the negotiations having been conducted by T. E. Jefferson, in New York. Development, it is said, is to be started without delay. Henry Lees has arrived to take charge of this work.

**SMITHERS.**—James Cronin, of Spokane Wn., well-known as a British Columbia mine operator, is said to have sold the Babine-Bonanza Mine, upon the development of which he has been engaged for several years, to Messrs. Woods & Taylor of Fernie. This property is situated near Smithers, northern British Columbia.

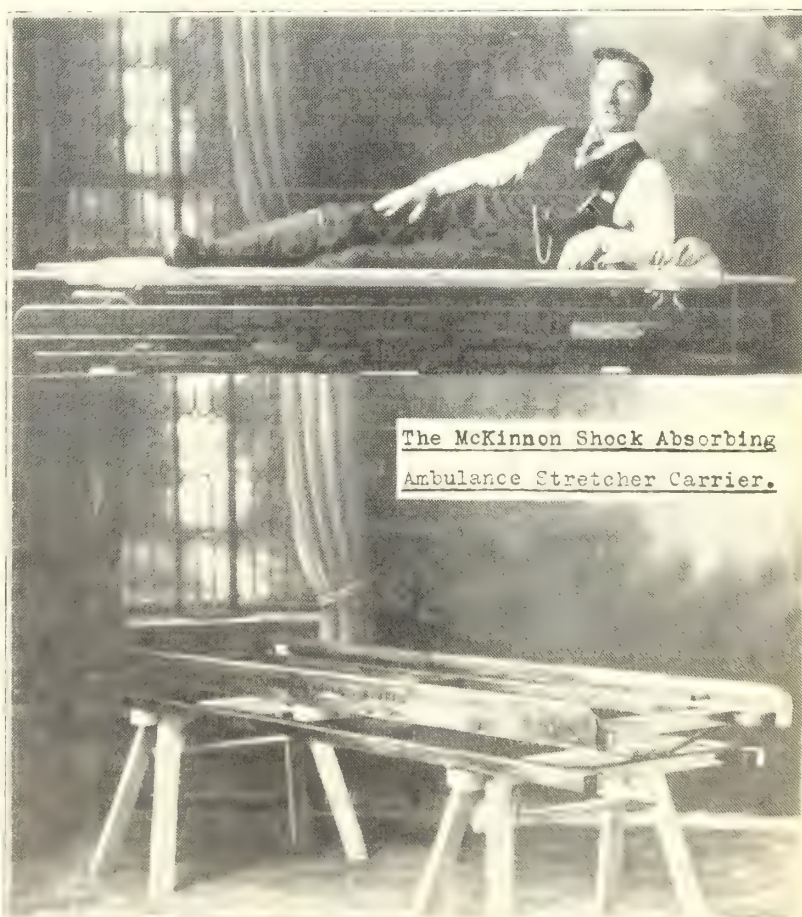
**OPTION ON DOLLY VARDON.**—Mr. W. J. E. Taylor, of the Taylor Mining Co., is reported to have been given a year's option for the sale of the Dolly Vardon and Wolf Mines, Alice Arm. This has been granted by George Wingfield and Associates. If Mr. Taylor succeeds it is expected that he will be able to discharge

his company's liabilities in full. Under the circumstances it is regarded as doubtful as to whether the Dolly Vardon will be operated this season.

## NOVA SCOTIA

**FIRST AID.**—An improved type of stretcher is being used at the Cape Breton collieries this winter for the first time. It is intended for hospital ambulances only. The general comments of colliery physicians and hospital matrons is most favorable. The patients who have had occasion to use it loudly acclaim its merits. The Coal Company and the miners have been looking for just such a stretcher for a long time, and they are fully satisfied that they have now something that meets their requirements.

With the two large colliery hospitals situated at Glace Bay, a distance of from eight to ten miles from the farthest collieries on either side, much discomfort was experienced and delay caused to sick and injured patients by bad roads at certain seasons of the year when they were almost impassable. The Dominion Coal Company had purchased and fitted up ambulances to con-



The McKinnon Shock Absorbing Ambulance Stretcher Carrier.

vey the injured workmen and members of their families, in case of serious illness, to these institutions. But even with these it was felt that something better was necessary than the stretcher in use, although it is the latest American Army type. As is commonly the case, the man arose for the occasion and one of Cape Breton's



own sons, John F. McKinnon, showed himself equal to the task of making a stretcher that absorbs all the jolts and jars caused by bad roads. It is called the Shock Absorbing Ambulance Stretcher Carrier. It consists of a lower rigid frame that supports on shock-absorbing springs an upper frame upon which a stretcher is placed and fastened, the whole device being secured to the floor of the ambulance.

The device is light enough to be easily handled and is strong enough to withstand the long journeys over bad roads. It is just the thing needed at the collieries or any other works where industrial casualties of sick patients have to be carried any distance. Where the roads are good, the use of the stretcher almost eliminates the sense of motion.

The Dominion Coal Company, realizing the fuel value of the invention, were quick to adopt it and put it into service throughout their large colliery districts. The maker has registered his stretcher in Canada and the United States.

**DAMAGE TO STEEL PLANT.**—More damage was done at the steel plant and coke ovens Sydney during the short strike that took place there than is openly admitted. Yet it is due to the concealment of such things that the public remain ignorant of the gravity of the case, and the body of public sentiment necessary to prevent a recurrence of such acts is not permitted to form and function in the interests of good industrial conditions and trade stability.

**ACTIVITY IN EDUCATION.**—At no time in the Glace Bay has such interest been taken in adult education as at present. The Technical Schools have an attendance of one hundred and forty, and this would be much greater if more teachers could be provided. The People's School has over three hundred on its roll. This

school is being conducted by the St. Francis Xavier College, Antigonish, and many subjects are taught. Mining and Engineering schools are also helping to attain the standard of education aimed at by the miners of this town. At each of the mining and engineering schools, in the colliery village, First Aid classes are being carried on.

### FUEL BRIQUETTES IN 1922

A new record of production of fuel briquettes in the United States was established in 1922. Reports to the United States Geological Survey show that the total output was 619,425 net tons against 398,949 tons in 1921. In comparison with 1920, the year in which the previous maximum was attained, the increase was slightly over 9 per cent. Production in all districts in 1922 was larger than in the year before, the principal increase occurring in the Central States. The chief factor in the improvement in that territory was the increased demand for briquettes to make up the deficit in domestic anthracite in the region supplied from the Upper Lake docks. The total value was \$5,444,926. The total quantity of raw fuel used was 609,186 net tons, of which 43 per cent was anthracite or semianthracite, 39 per cent semibituminous slack, bituminous slack and coke, and 19 per cent. subbituminous coal and oil gas residue.

Bentonite, the colloidal clay found so abundantly in Saskatchewan, has a much greater suspending power than ordinary clays. It is proposed by ceramic engineers, therefore, to use it as the medium for carrying the frit in enamelling, as it is desirable to reduce the clay content of the frit to a minimum.

## INDEX TO MINE AND MILL SUPPLIES

Addresses of advertisers whose names appear in the following classified index, may be found upon reference to other advertisements. An alphabetical index to advertisers will be found on the page facing the inside back cover. The following regulations apply to all advertisers:—One-eighth page, every issue, three headings; one-quarter page, every issue, six headings; one half page, every issue, six headings; one half page, every issue, twelve headings; full page, every issue, twenty-four headings. Buyers who are unable to find in the classification heregiven such machine or supplies as they desire are invited to write Service Dept., Canadian Mining Journal, Gardenvale, Que., who can in all probability, refer them to proper sources.

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- Building and Ornamental Stones of Canada (British Columbia.) Vol. V., by W. A. Parks, Ph. D.
- Barium and Strontium in Canada, by H. S. Spence.  
The Coalfields and Coal Industry of Eastern Canada, by F. W. Gray.
- The Value of Peat Fuel for the Generation of Steam, by J. Blizard, B. Sc.
- Analyses of Canadian Fuels. Parts I to V, by E. Stansfield M. Sc., and J. H. H. Nicolls, M. Sc.
- Graphite by H. S. Spence.
- Gas Producer Trials with Alberta Coals, by J. Blizard and E. S. Malloch.
- Summary Report of the Mines Branch, 1920.  
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- Summary Report.** The annual Summary Report of the Geological Survey is now printed in parts. Applicants should, therefore, state what particular geologist report is required, or what subject they are interested in.
- Memoir 108. The Mackenzie River Basin, by Charles Camsell and Wyatt Malcolm.

### GEOLOGICAL SURVEY

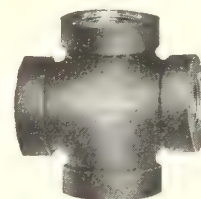
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- Memoir 119. The Reed-Wekusko Map-Area, Northern Manitoba, by F. J. Alcock.
- Memoir 121. The Malagash Salt Deposit, Cumberland County, N. S., by A. O. Hayes.
- Memoir 123. Sixtymile and Ladue Rivers Area, Yukon, by W. E. Cockfield.
- Memoir 125. Sedimentation of the Fraser River data, by W. A. Johnston.
- Memoir 127. Beauceville map-area, Quebec, by B. R. McKay.
- Memoir 128. Winnipegosis and Upper Whitemouth River areas, Manitoba, Pleistocene and Recent deposits, by W. A. Johnston.
- Memoir 130. Geology and mineral deposits of the Bridge River map-area, British Columbia, by W. S. McCann.
- Memoir 131. Kenogami, Round and Larder Lake areas, Timiskaming district, Ontario, by H. C. Cooke.
- Map 1585. Mackenzie River basin, 1922 edition. Geology.
- Map 1751. Wainwright, Alberta. Topography.
- Map 1752. Monitor, Alberta and Saskatchewan. Topography.
- Map 1754. Upper Elk and Highwood rivers, British Columbia and Alberta. Topography.
- Map 1829. Salmon River area, Portland Canal mining division, B. C. Geology.
- Map 1831. Vegreville; townships 47 to 55, ranges 11 to 16 west of the 4th meridian, Alberta. Topography.
- Map 1835. Beauceville, Beauce county, Quebec. Geology.
- Map 1836. Explored routes in a belt traversed by the Canadian National Railways between Longlac and Nipigon, Ontario. Geology.
- Map 1860. Keno Hill area, Mayo district, Yukon. Geology.
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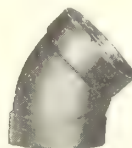
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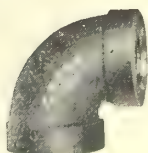


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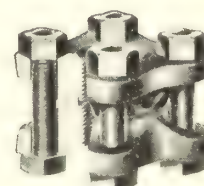


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# Ontario's



# Minerals

PROVINCE OF ONTARIO

DEPARTMENT OF MINES

HON H. MILLS, Minister of Mines

## Mineral Areas.

Ontario, with its 407,262 square miles, contains many millions of acres in which the geological formations are favorable for the occurrence of minerals, 70 per cent of the area being underlain by rocks of pre-Cambrian age. The phenomenally rich silver mines of Cobalt occur in these rocks; so also do the far-famed nickel-copper deposits of Sudbury, the gold of Porcupine and Kirkland Lake, and the iron ore of Magpie and Moose Mountain mines.

## Economic Minerals.

In addition to the above, practically all economic minerals (coal and tin excepted) are found in Ontario:—actinolite, apatite, arsenic, asbestos, cobalt, corundum, feldspar, fluor-spar, graphite, gypsum, iron pyrites, lead, mica, molybdenite, natural gas, palladium, petroleum, platinum, quartz, salt, talc and zinc. This Province has the largest deposits on the continent of talc, feldspar, mica and graphite.

Building materials, such as ornamental marble, limestone, sandstone, granite, trap, sand and gravel, lime, portland cement, brick and tile, meet every demand.

## Mineral Production.

Preliminary returns show the output of the mines and metallurgical works of the Province for the year 1921 to be worth \$48,128,387, of which the metallic production was \$27,574,202.

The following figures show the rapid growth of Ontario's mineral industry by five-year periods since 1891:

| Year.          | Value.      | Year.          | Value.       |
|----------------|-------------|----------------|--------------|
| 1891 . . . . . | \$4,705,672 | 1906 . . . . . | \$22,388,383 |
| 1896 . . . . . | 5,235,003   | 1911 . . . . . | 41,976,797   |
| 1901 . . . . . | 11,831,086  | 1916 . . . . . | 65,303,822   |

## Dividends.

Dividends and bonuses paid to the end of 1921 amounted to \$23,140,734 for gold mining companies, and \$84,388,185 for silver mining companies or a total of \$107,528,919.

## Mining Regulations.

A miner's license costs \$5.00 per annum, and entitles the holder to stake out in any or every mining division three claims of 40 acres each. After performing 200 days' assessment work on a claim, patent may be obtained from the Crown on payment of \$2.50 or \$3.00 per acre, depending on location in unsurveyed or surveyed territory.

## Assay Office.

The Provincial Assay Office at No. 5 Queen's Park, Toronto, is maintained by the Department of Mines for the free identification of minerals, free assays under the provisions of the Mining Act of Ontario, and also for general assay work as per the Schedule of Charges which may be obtained on application.

## Temiskaming Testing Laboratories

The Department maintains, at Cobalt, an ore sampling and testing laboratory which is now prepared to receive parcels of gold ore from 100 pounds upward, and after sampling and assaying the same to pay to the shipper the value thereof, less treatment charges. The purpose is to afford a market for ores extracted by prospectors and others in developing their mining claims, enabling them to obtain funds which they can use for further work and to report on the most satisfactory method of treatment. Fuller information may be obtained on application to the Manager, Temiskaming Testing Laboratories, Cobalt, Ontario.

## Publications.

For list of publications, illustrated reports, geological maps and mining laws, apply to

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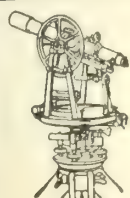
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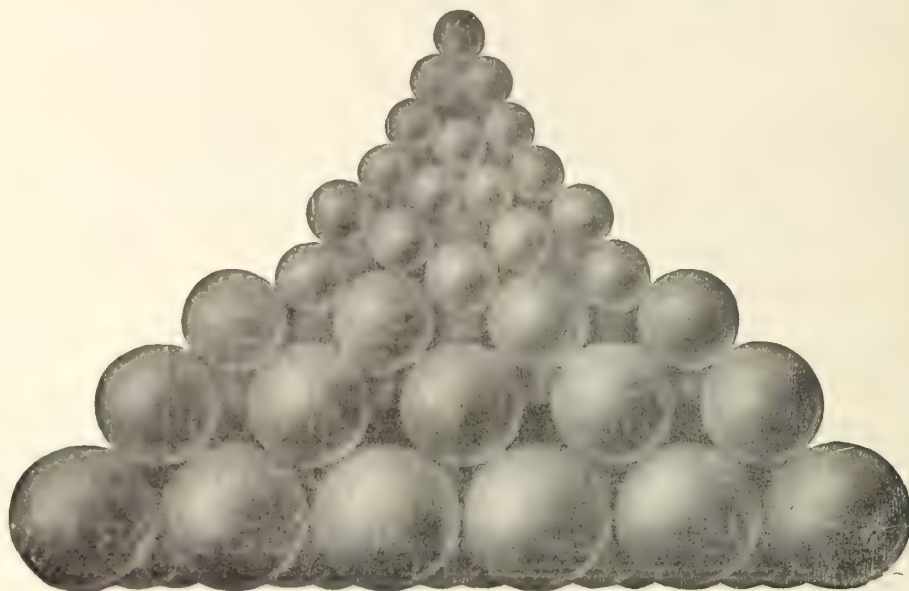
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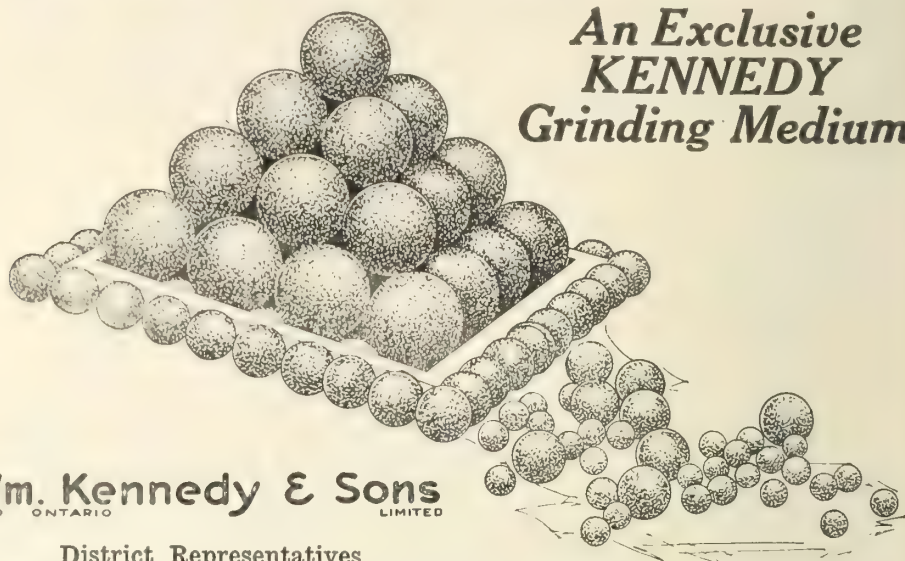
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## -:- EDITORIAL -:-

### THE ANNUAL MEETING

"Service through coöperation" was the keynote of the annual meeting of the Canadian Institute of Mining and Metallurgy in Montreal last week. This note was struck by the retiring president, Mr. W. R. Wilson, in his opening address, and it was reflected in no uncertain way in the resolution on fuel supply addressed to the federal government in which the meeting culminated.

The symposium on fuel supply with which the meeting was mainly concerned had been well conceived and presented the various phases in something like their proper proportions. The papers were excellent and were supplemented where required by well-informed discussion. The members studied the problem from the various angles in which it was presented by successive speakers, and were quick to seize and hold the salient points. When Dr. C. V. Corless epitomised the situation as "Alberta's coal — Ontario's market — the idle railways in between," the Institute's stand was made. The lengthy and dignified resolution forwarded to the federal administration at the end of the meeting merely expanded this idea.

This is the first occasion for many years past on which the Institute has taken concerted and determined action on a problem of national scope and importance. The problem is not, be it noted, merely a technical problem; it is one that involves mining, transportation, merchandising and research, and that affects seriously and directly every citizen of Canada. The Institute has tackled a national problem, with some prospect of a successful issue.

The interest and enthusiasm shown by those that attended the meeting is direct and indubitable evidence that activity of this sort is what is needed to make the Institute a vital force not only in the lives of its individual members, but in the community in general. Let us tackle big, national, worth-while problems in a generous spirit, and we shall have the energy not only to find the solutions for these problems and put them into effect, but likewise a never-failing surplus of energy to devote to our own affairs, peculiar to the mining industry and affecting principally ourselves. Let us, one and all, devote a fair share of our energies first, to the service of our country, and second, to the service of our fellow-members in the Institute, and the resulting benefit to ourselves will, in this case as always, more than repay us for our efforts.

The Institute has devoted its annual meeting for

1923 to a national problem well worthy of its best efforts. The result is most encouraging to those that have the welfare of the Institute at heart. We hope that this will provide a precedent by which the present and future executives of the Institute will shape their course.

### QUEBEC'S MINERALS

In commenting on the Quebec Bureau of Mines' report of mineral production for 1922, the Montreal "Gazette" remarks: "Quebec is not possessed of such large or varied mineral deposits as some of the other provinces." Unless this statement is meant to describe the **developed** mineral resources, it is at the least a bow drawn at a venture, and possibly is a libel on the province of Quebec. The statement is made so frequently in the public pass that it should not stand without correction.

The fact is that there has been so little work of exploration and prospecting done in the province of Quebec that the extent of its mineral resources cannot be properly gauged. Until this prospecting shall have been done, our best guide in judging the potential mineral production is the geological evidence available. This evidence points to the conclusion that Quebec will have eventually a production of minerals at least equal to any other province in the Dominion, excluding, of course, coal.

A number of causes have contributed to the slow development of Quebec's mineral resources as compared with, say, Ontario. Until comparatively recent years the mining laws made it so difficult for *bona fide* prospectors to secure the fruits of their labours that few of them cared to pursue their vocation in the province. The finds of mineral actually made were more by chance than as a result of deliberate search. Now, happily, the Quebec mining law is as good as any in the land and is administered in such a way as to ensure each and every prospector of honest and equitable treatment. The result is evident already in the numbers of prospectors that have invested time and money in the new gold district of northwestern Quebec.

It is certain that, now the prospectors have tested the mining laws and their administration in Quebec and found them so favourable to themselves, there will be a great deal of exploratory work done throughout the newer parts of the province from now on. Experience has shown that a mining boom, and particularly a gold mining boom, if conducted rationally and with even a modest degree of success, stimulates ac-



only among prospectors that lasts for years. Ontario had the early advantage of the accidental discovery of the Sudbury nickel deposits. The gold boom in northwestern Ontario was conducted with so little regard to the principles either of engineering or finance that it has virtually closed that promising district to development from that day to this. The discovery of Cobalt, accidental again, bred a new generation of prospectors, whose search has revealed the gold deposits further north, and now promises to disclose another productive area across the border in Quebec.

A third disadvantage under which the prospective mineral industry of Quebec has laboured is the disposition of the railways in the province, as well as of the larger areas of arable land. A navigable sea route to Montreal is decidedly an advantage to Canada and Quebec, but it has meant that the lines of railway are confined principally to a small corner of the province, and that corner not particularly favourable to mineral production. As the principal farming districts are in the same small sector along the St. Lawrence, the farmers have not aided materially in drawing the railways outward. Thus access to the possible mineral-bearing lands is difficult, and even were valuable deposits found by men searching from the canoe routes their inaccessibility would in most cases make them valueless.

For generations to come, Canada's chief market for her mineral products must remain in the United States and overseas. In the case of most minerals our annual production is already far in excess of our annual need, and there will be a growing disparity between our population and our output of minerals. In this export trade Quebec, with fifteen hundred miles of seaboard bounding a vast unprospected territory that promises much in mineral production, is bound to hold a commanding position. Her ports will serve directly the market surrounding the Atlantic—the largest market for mineral products in the world.

### THE PROPOSED COKING PLANTS

One of the three important points connected with our fuel problem that the Dominion Fuel Board has recommended to be fully investigated is the provision at strategic points of coke in large quantities for domestic fuel. These points are the large cities, the principal markets for domestic fuel. They can use all the motor fuel the coke-ovens can produce, and their manufacturing industries will consume various other by-products. Intensive farming, requiring artificial fertilizers such as ammonium sulphate, is practised most near the large centres of population, so this important by-product will find a ready market near by.

Of all the various useful materials resulting from the coking, the disposal of the vast quantities of gas

appears to present the only problem, and even this apparent difficulty disappears on closer examination. There is already a large market for gas in the cities, both for domestic supply and for industrial purposes, and a slightly cheaper supply would stimulate its use greatly. It has been stated on good authority that coke-ovens can be operated profitably in the way proposed even without the sale of gas, and the possibility of cheap gas can be based safely on this statement.

First consider the domestic use of gas. At present a good part of the cooking in cities is done over gas burners. This is capable of some extension. But the largest potential use in private houses is for heating. Gas is a more convenient fuel even than oil. At present it cannot be used for heating houses because of the excessive cost. If the price were brought down sufficiently many householders would use it for heating—a luxury, to be sure, in comparison with coal or coke, but a luxury of which many would avail themselves. After a few years the price of gas and its use would strike an automatic balance, probably at a point that would be highly remunerative to the vendors.

Certain manufacturing industries would be expanded and others established were cheap gas available, especially those that make use of reverberatory or crucible furnaces. Take, for instance, the manufacture of pottery. Within easy reach of Montreal there is available China clay, feldspar and quartz, the three requisite minerals, sufficient to support a thriving industry. The supply of labour is good, Montreal is already the chief point of entry and distribution for the pottery used in Canada, and there is a protective tariff. The only feature lacking at present (apart from human initiative) is cheap gas fuel. The proposed coking plants would provide that fuel.

Central coking plants may prove to be an important aid not only to our domestic fuel supply, but to our industrial progress. We shall follow with interest the investigation about to be undertaken on the recommendation of the Dominion Fuel Board.

### ARGONAUT

The long-expected re-organization of Argonaut Gold, Limited, has been postponed once more. The public is to be invited to buy another million dollars' worth of stock. As all the present authorised stock is already issued, the authorised capital is to be increased by that amount. It is time the facts of the case were stated publicly.

The Argonaut company is developing the property of the old Huronia company, north of Larder Lake, Ontario, under a coöperative agreement, the terms of which have not been divulged. It is not known publicly what relation the directors of Argonaut bear to the owners of the mine, that is whether the directorates are inter-locking. The mine promises to be a genuine

producer, though the presence of copper pyrite in the ore makes the extraction of gold difficult and expensive, and faulting and other irregularities in the ore-bodies have resulted in abnormally high mining costs. Though it seems probable that by careful management the mine can be made to pay for working, there is no evidence that it will be a big mine or that profits will be large. In fact, all the evidence available indicates that the mine management will have their hands full paying working expenses and interest on the comparatively small amount of capital invested in mine and mill, and that there is only a remote chance of there ever being a surplus for the payment of dividends on the relatively large issue of capital stock.

The obvious and usual course in such a case is to "squeeze out" the investors by means of a re-organization of the company, when the resulting new concern can operate profitably, provided the mine and mill give a favourable balance. Instead of this, the directors propose to raise money to re-imburse themselves for advances (of stock) made, to pay off the owners in the Huronia company (who are they?) and to provide working capital. This will simply add to the burden, already hopelessly heavy, that the little mine now carries, and will merely accentuate the crash when it comes — for it is bound to come.

The Argonaut directorate have been running a bluff for many months. Their intention may be right, but their action is most decidedly wrong. The mining industry of Canada is bound to suffer through their mis-directed efforts, and the agony should not be increased or prolonged. It is high time this bluff was called.

We wish to draw attention to the letter on another page from Mr. J. J. Harpell. This corrects a statement made by Mr. E. P. Mathewson at the annual banquet of the Canadian Institute of Mining and Metallurgy last week, and also will serve to correct the false impression that Mr. Mathewson's mis-statement has spread abroad.

It is heartening to have the official announcement of the Lignite Utilization Board of the Federal, Manitoba and Saskatchewan governments that the experiments with lignite at Bienfait, Saskatchewan, are likely to be concluded successfully in the near future. The members of this board have no reason for making an over-hopeful announcement; in fact we would judge that their conclusion would be well on the conservative side. There have been rumors lately that the expenditure of nearly a million dollars at Bienfait had been wasted; we shall be glad to see still further evidence that the expenditure has been justified.

The colliery workers of Springhill, Nova Scotia, have offered to contribute to an old age pension fund for miners, provided the operators and the provincial government each contribute an equal amount. This

would appear to be a fair offer, of a sort calculated to help on towards the much-needed stability in labour conditions.

### SYNTHETIC KEROSENE!

Many stories have been told and a multitude of articles have been written concerning the development of the process of crude oil refining. The following incident is vouched for by an anonymous chronicler, whose imagination apparently sometimes works overtime.

Of all refining systems in use, a town in Wyoming boasts the one which has the world beaten.

In the shallow fields of this area there is very high gravity crude oil and occasionally there is found a spring where crude oils runs out on top of the water. During the dry season one summer, a farm boy was herding the family cows near one of these springs so that he could catch frogs during his idle moments. One evening, after milking, the boy's mother noticed that the milk smelt like gasoline. She called her husband's attention to it and he immediately held a lighted match to the pail and found to his surprise that the contents would burn. He then secured a hydrometer, and upon weighing the milk found it was a mixture of kerosene and gasoline.

The boy was called and queried, and at once the family set out to ascertain why the milk had been spoiled. They found that the cows had been drinking this water with crude oil floating on it. That gave the old man an idea and he gradually increased the amount of crude oil in the water until he had his cows drinking the pure stuff.

Then, by a little experimenting he found that he could milk four times a day and get some four gallons of 58 gravity gasoline and one-half gallon of 42 gravity kerosene each time. So he increased his herd and began bucking the refineries with the result that it was not long until he was forcing prices down. Soon he was not only supplying his home town, but laying pipe lines to other nearby centres and supplying the latter with their gasoline and kerosene.

The chronicler concludes by stating that the last he knew of the man was that he had resigned his job and was spending his winters in California and his summers in Muskoka, fishing and trying to keep his money down so that he could count it. — Imperial Oil Review.

### APOSTROPHE — WARNING

Editor, high on Olympus,

Calmly complacent, serene,

Why do you constantly crimp us?

Answer me squarely, old bean!

Editor, sinless, impeccable,

Pretermite preaching a while;

Pray do not think for a second

That we are compounded of guile.

Editor, perched on a pinnacle,

Lofty, contemptuous, remote,

Gee! what a biff on the binnaele

You'll get when I capture your goat!

J. C. M.



## "Of Sundry Minerals And Metals"

By J. C. MURRAY

Towards the closing years of the reign of Queen Elizabeth, there was written and published in London a book of unique interest. The author was one William Harrison, a Church of England clergyman. His book is the "Description of Britain and England." It appeared in the year 1587. To quote the erudite editor of the modern edition of Harrison, "the book is a deliberately drawn picture of Elizabethan England."

We cannot here touch (alas!) upon the entrancing chapters in which Harrison discourses on the manners, morals, and customs of his fellow Elizabethans. These chapters are photographically minute in detail, jewelled with kindly and caustic human touches, and pre-eminently readable. Only two chapters are pertinent to our present purpose.

The first of these is entitled, "Of Sundry Minerals and Metals." The chapter opens with a tirade against Englishmen for their besotted ignorance of their country's natural wealth. "There is no temporal commodity", writes Harrison, "necessary to be had or craved by any nation at God's hand that he hath not in most abundant manner bestowed upon us Englishmen, if we could see to use it and be thankful for the same." So little appreciative, indeed, were Englishmen of nature's bounty to them, that foreigners, says Harrison, would boast of buying the "case [skin] of a fox" from an Englishman for a great (four pence), and selling him back the tail alone of the same animal for twelve pence! "Would to God we might once wax wiser and each one endeavour that the commonwealth of England may flourish again in her old rate and that our commodities may be fully wrought at home... and not carried out to be shorn and dressed abroad." A sound petition, as appropriate to Canada today as it was to the England of Elizabeth's time!

"But to my purpose." In England, we read, there was great plenty of quicksilver, antimony, sulphur, black lead, and red and yellow orpiment. In addition, natural "cinnabarum" was found in abundance, and "the sulphurous glebe called bitumen in old time... burned in lamps when oil is scant." "Geson," which we take to be plaster of Paris, is mentioned, as also are chrysocolla, copperas, and "mineral stone, whereof petroleum is made". In sundry places, distant from the shore, the mineral pearl was digged out. "They are for greatness and colour most excellent of all other". (What would Mr. Dana say to that?) The author here laments that a great abundance of "rare and excellent commodities" had in times past been washed away from both Cornwall and Devon by the violence of the sea.

Coal was little used in England in those days, chiefly on account of the execrable roads. Iron and steel smelting and forging was done with charcoal. Harrison deplores the rapid depletion of the fine old forests, and predicts the day when "sea coals" will be generally used.

"We have pits... of white plaster, and of fat and white and other coloured marble, wherewith in many places the inhabitants do compost their soil, and which doth benefit their land in ample manner for many years to come." Saltpeter, too, and "salt

soda", for powder-making and glass-making, respectively, were plentiful, and much fine moulding clay. A pious exhortation to thankfulness concludes this section.

The section on metals is introduced with the sweeping statement that "all metals receive their beginning of quicksilver and sulphur, which are as mother and father to them. And such is the purpose of nature in their generations that she tendeth always to the procreation of gold." Nature more often fails than not, we are told, because seldom are quicksilver and sulphur mixed in the right proportions to generate gold. This assumption is validated to Mr. Harrison's satisfaction by the fact that gold is so often found corrupted by other metals. On such tenuous threads hung much of the science of the age.

Passing reference is made to the gold brought to England by Sir Francis Drake on his return from the West Indies (1582), and to Frobisher's costly error in mistaking "dross", (pyrite probably), for gold, on an island encountered in his search for a shorter cut to the "peaceable sea and kingdom of Cathay... Such was the plenty of ore there seen that if it had holden perfect, might have furnished all the world with abundance of that metal". For this digression Harrison apologizes.

Tin was, of course, plentiful in Cornwall and Devonshire "and sundry other places"; lead in Devonshire and elsewhere. Pewterers, we are informed, who formerly made only pots and dishes for domestic use, had grown into such exquisite cunning that "they can in manner imitate by infusion any form or fashion." Considerable space is devoted to a discussion of pewter and pewter "garnishes", or sets. It is mentioned that on the Continent "a garnish of good flat English pewter... is esteemed almost as precious as the like number of vessels that are made of silver." The lead mines of Wales, we read, endured until the people had used up all their wood. Iron ore was abundant, particularly near Manchester. Though it was "fine and good stuff as any that cometh from beyond the sea," yet it was a little esteemed. Harrison deprecates his countrymen's indifference to the possibilities of the industry. A curious sentence occurs here, a metallurgical hope. The iron and steel produced in England needed toughening. The metal, thinks Harrison, was "easy to be made tougher, if our alchemists could once find the true birth or production of the red man, whose mixture would induce a metallic toughness unto it, whereby it should abide the hammer."

Of copper Harrison observes that it "is lately not found [discovered], but rather restored to light". The "governance" of English copper mines had been in the hands of foreigners, and "profit doth very hardly countervail the charges." The section closes with the statement that "brass" is found in England (in a natural state!), but in small quantities.

The second chapter with which we have to do is headed, "Of Quarries of Stone for Building."

In former times, Harrison points out, the use of building stone was confined to churches, monasteries, and palaces. In Elizabeth's time, however, noblemen and gentlemen had begun to look upon timber as "not



"much better than paper work, of little continuance." He confesses his inability to classify and describe the different stones used; nevertheless, he makes a brave attempt, prefacing his remarks with a strong protest against the manufacture and use of brick when such plenty of natural stone lay ready to hand.

Here is a touch that we can readily appreciate:—"Our elders have from time to time, following our natural vice in misliking of our own commodities at home, and desiring those of other countries abroad, most esteemed the Caen stone that is brought hither out of Normandy." He goes on to show that English quarries could supply stone of equal or greater merit. He lists "white free stone, slate, and mere stone... paving stone, toph [standstone]," and so on. "Whereby," he continues, "it appeareth that we have quarries enough in England...if the peevish contempt or our own commodities...did not catch such foolish hold on us."

Evidently experiments were then being carried on in moulding cement mixtures for building forms, for "we have now devised to cast it in moulds for windows and pillars of what form and fashion we list." And "Sir Ralph Burcher, knight, hath put the device in practice." Sir Ralph is quoted as affirming that the business would bring more profit in six months, employing six men, than the ordinary building trade would bring in six years employing twelve men. There is no evidence that Sir Ralph's sanguine expectations were realized.

The discovery of fossils in stones is reported by Harrison with frank amazement. He does not expect his readers to believe him.

But the burden of his song is ever the Englishman's crass indifference to, and neglect of, his country's resources.

\* \* \*

It is well-nigh three centuries since William Harrison was gathered to his fathers. His wit and wisdom are as vital today as when he perpetuated them on paper. The foibles and foolishnesses of mankind are the same in kind if not in degree. Harrison recognized and derided them for the benefit of all succeeding generations.

### JOHN ALEXANDER DRESSER

President of the Canadian Institute of Mining and Metallurgy

At the annual banquet of the Canadian Institute of Mining and Metallurgy, held in the Mount Royal Hotel, Montreal, on March 11th, Mr. W. R. Wilson introduced to the members of the Institute, as their President for the ensuing year, Mr. John A. Dresser.

Mr. Dresser was born at Richmond, Que., on June 27, 1886. After a preliminary education at St. Francis College, he took an Arts course at McGill University, obtaining his bachelor's degree in 1893 and his master's degree in 1897. Mr. Dresser followed this very thorough preparation by post-graduate work at Harvard. His first work after leaving the University was educational, and he was principal of Shawville Academy, Aylmer Academy, St. Francis College, and the Grammar School at St. Henri, successively.

During his studies at McGill Mr. Dresser became interested in geology and, this interest continuing and growing, in 1909 he joined the staff of the Geological Survey of Canada, but in a short time resigned to

become manager of the Lands Department of the Algonma Central Railway. While in this position he was instrumental in developing a considerable area of land, his geological knowledge being supplemented by good organizing ability. At the expiration of his contract with the Company Mr. Dresser took up consulting work in Montreal, and among many other investigations in recent years has been doing geological exploration for oil in the Peace River district on behalf of the British Columbia Government. He has been president of the Geological Section of the Royal Society of Canada and is a member of many learned Societies. He became a member of the Institute in 1902, and was Councillor in 1910-11, and again in 1916-17, as well as being Chairman of the Montreal Branch in the latter year.

Mr. Dresser's geological work has been varied, and his record of such work is voluminous. His reports on "The Copper-bearing Rocks of the Eastern Townships" and the Asbestos District of Quebec are part of the authoritative literature upon these subjects. He



MR. JOHN A. DRESSER

has studied the district around Lake St. John, Que., an area along the National Transcontinental Railway in Southern Quebec, and the Peace River country in British Columbia.

Mrs. Dresser, formerly Miss Jean Lindsay, is as charming in manner as her husband; in fact, those who have the privilege of knowing her have no difficulty in deciding that his "better half" inspires Mr. Dresser constantly to maintain his friendly and genial attitude toward his fellow men.

In appearance the President is a man of medium stature, heavily built, but very alert. Probably his eyes are his most striking feature; set wide apart, light blue in colour, they look one fairly in the face, giving the impression of uprightness and reliability, — an impression borne out by his record. His varied experience and well-balanced judgment, combined with his kindly disposition, are ample assurance that the Institute will have capable and faithful guidance during the ensuing year.



# The Annual Meeting

CANADIAN INSTITUTE OF MINING AND METALLURGY  
MONTREAL, MARCH 7th TO 9th

The Canadian Institute of Mining and Metallurgy's annual meeting in Montreal last week marked the culmination, though not the end, of a serious effort on the part of its members to investigate Canada's fuel problem and to point the way to a solution. That the problem might have a thorough examination from every angle, authoritative representatives of the bituminous and anthracite coal fields of the United States and the Welsh coal operators were invited to submit papers and to join in the discussion. The result was most illuminating and interesting, not only to the members of the Institute present, but to the public at large, as evidenced by the comprehensive reports of the proceedings published by the newspapers and studied by their editorial writers. The third day was devoted to topics of more purely technical interest, each important in its own field.

## The Business Session

The meeting was opened by the President, Mr. W. R. Wilson, president of the Crow's Nest Pass Coal Company, the principal coal producer in the Canadian west, who is one of the veterans of our mining industry.

After referring to a "cullud" version of the Red Sea episode, wherein the friction of Moses' rapidly waving wand congealed the surface and allowed the children of Israel to pass over in safety, Mr. Wilson opened the discussion of Institute affairs. The report of Council for 1922 was adopted and auditors appointed. A discussion on Institute publications was opened by the distribution of two parallel statements, showing in one a budget on the basis of the "Canadian Mining Journal's" offer to print free of charge the matter now contained in the "Bulletin", and in the other, the budget adopted by Council, providing for the present attenuated "Bulletin", edited by the secretary, whose activities will now keep him busy at headquarters. The discussion brought out the fact that the Institute's reserve funds had been drawn upon during 1922 to the extent of \$6,000, and that the bank balance had been reduced by \$3,500 during the year, giving an over-expenditure during the year of approximately \$9,500. The fact of the "Bulletin's" competition with the "Journal" in the field of technical journalism was well aired. At this meeting, as at previous gatherings, the consensus of opinion was that the "Bulletin" is a necessary agency in holding together the Institute's scattered members.

The amendment to the by-laws proposed by the Western members was unanimously opposed by the meeting, there being present no representative of those supporting the proposal. The by-law will be submitted by letter ballot to all the members.

## President's Address

In his presidential address, Mr. Wilson reviewed briefly the history of the Institute during the quarter century of its existence. The twenty-three charter members formulated a sound and lasting plan when they applied for incorporation in 1898. They gauged well the enormous potential mineral production of this half-continent, and provided in their plan for the development of a large and sound mineral industry.

Here Mr. Wilson interjected the remark that we had plenty of men to work our mines, as well as the deposits themselves, however dangerous the mining might be. Some people have the erroneous idea that miners can be frightened away from a dangerous mine; but his experience has been that white men are actually attracted by the danger. White miners like a risk.

During the twenty-five years of its existence the institute has increased in numbers on an average of 56 annually, and now has 1,620 members of all classes. Our mining industry has increased in like proportion, and it is evident that this annual growth will certainly not be retarded for many years to come, and may even be accelerated. This rapid expansion of the industry indicates the opportunity not only for young mining engineers, but also for investment.

The Institute is represented publicly by its President and Council. The successive Councils, under the guidance and stimulus of their presiding officer, have sought, successfully, to spread abroad the knowledge and sound principles they themselves possessed. This spirit of coöperation with his fellows is the white man's glory, and Canadian mining engineers have not failed to live up to their privilege. During the year 1922 the Institute has contributed 62 technical papers, of which 13 deal with geology, 5 with metallurgy, 14 with coal, 6 with metal mining, 8 with subjects related to Institute organization and procedure and 16 with sundry subjects. The common advantage of these papers and the discussion they provoke constitutes one of the most laudable objects of a technical institution.

In conclusion, Mr. Wilson upheld the principle of donations to the Institute funds, either by individuals or by companies. He pointed to the fact that the technical employees of mining companies derive tangible, and often very important, advantage from the Institute, which is reflected in their increased usefulness to their employer. It is only just, then, Mr. Wilson held, that this employer should refund to the Institute at least a small part of the gain resulting from its activities.

## Mineral Statistics

As usual, the first definite mineral statistics for 1922 were presented at this meeting. Mr. S. J. Cook of the Dominion Bureau of Statistics presented a 50-page report covering the Dominion. This showed an increase in the aggregate of 1.3 percent over the preliminary estimate published at New Years. The metallic products showed an increase over 1921 of 23.9 percent, being \$61,144,990. The most notable increase is gold, by 32.8 percent, the value being \$25,446,717. Non-metallies decreased in value 5.99 percent, to \$82,582,339. Structural materials and clay products increased 13.0 percent, to \$39,302,266. The grand total was \$183,029,595. Ontario, with \$65,370,366 to her credit, has increased her lead among the provinces. British Columbia stands a good second at \$39,166,614, while Nova Scotia and Alberta run a close race for third with \$28,804,474 and \$25,717,572 respectively. Quebec's \$16,799,688 is accounted for mainly by the asbestos mines.



This over-development of mines is due to an indiscriminate leasehold system and has resulted in an unprofitable industry, whose operation is seasonal, with high wages and high operating costs. There are 400 coal mines in this district — several times as many as are required. The coal is graduated in quality from anthracite at Banff and the best grades of bituminous at Fernie and coal in general of the most desirable qualities in the mountains, to lignite in the far distant plains of Saskatchewan. Provided freight rates are sufficiently reduced, the Alberta coal bin can be drawn upon for Ontario's use.

### The Idle Railways

At this juncture Mr. T. W. Gibson read a letter from Mr. M. J. Butler that had just been published in the Toronto "Globe." Mr. Butler, a veteran railroader, pointed out that the problem of delivering Alberta coal in Ontario has not yet been seriously investigated. He advises an attempt to haul trainloads of coal over the favourable grades of the Transcontinental Railway in large cars and with heavy engines specially designed for the purpose. He estimates that 5000-ton trainloads could be handled in this way and that the cost would be as follows:

| Destination             | Distance<br>miles | Freight per<br>ton |
|-------------------------|-------------------|--------------------|
| Winnipeg . . . . .      | 900               | \$1.95             |
| Cochrane . . . . .      | 1751              | 3.50               |
| Port Arthur . . . . .   | 1413              | 3.13               |
| Port Colborne . . . . . | ....              | 5.50               |

The water freight and handling from Port Arthur to Port Colborne should not exceed \$2.50 a ton, which, with a mine price of \$2.00 a ton, gives a total cost of \$7.50 per ton at Port Colborne. Should further investigation show that Mr. Butler's figures are borne out, the importance of Alberta's coal to Ontario is obvious.

Dr. C. V. Corless, managing director of the Mond Nickel Company, upheld Mr. Butler's stand and epitomised Canada's fuel problem in three phrases — Alberta's coal — Ontario's market — the idle railways in between. He pointed out that the stake we are playing for as a nation is at present \$100,000,000 a year, the amount we pay to our neighbor annually for coal. At the present rate of increase, we shall need 100,000,000 tons of coal annually in twenty years time. The huge dimensions of these figures warrant our best efforts to make use of our own coal, and the expenditure of the requisite few millions in well-directed experiments. We are up against a new problem; the transportation of coal by land for a distance of 1,500 to 2,000 miles has never yet been investigated.

### The Manitoba Market

"The Problem of Replacing Foreign Coals in the Manitoba Market" was discussed by Mr. G. B. Saunders, of the Consumers' Coal Company, Winnipeg. Mr. Saunders is leading the fight for Canadian coal in Manitoba, and during the present year the efforts of himself and his associates have been successful. He points out, however, that the fight is not yet won. There still remains some of the unwarranted prejudice against Canadian coal, and though Canadian coal now supplies 50 to 75 percent of the Manitoba market, there is danger ahead. Manitoba is a favourite dumping ground for coal from the United

States, which is brought westward cheaply in steamships and freight trains that would otherwise be empty. Mr. Saunders pointed out that much American coal was sent to Manitoba last fall that should have gone to Ontario. The larger coal dealers in Winnipeg are, in general, in close alliance with coal producers in the United States.

Mr. Saunders said that the coöperation of the Institute and its members would be a valuable asset to the Alberta mine operators if exerted on their behalf. All varieties of coal, in any quantity desired, are available in Alberta, and the public must be educated to its use.

### Alternative Fuels

Mr. W. R. Wilon, the Institute's president, here gave some illuminating facts concerning the coke made at his own by-product plant in Fernie. A series of experiments had shown that it is possible to make coke with 4 to 6 percent volatile that is much superior to anthracite, both in convenience and in calorific value. He urged the use of coke for domestic heating.

Mr. Pearce, of the Canadian Pacific Railway, reinforced this view, supplementing it with the idea of using non-coking coals in a similar way, by carbonizing them and then briquetting by means of the tarry material resulting from the distillation. If the fine coal were washed to remove ash-forming materials before carbonizing, its value would be much enhanced, since a reduction of, say, 10 percent in ash would raise the value of the coal by about 25 percent. Mr. Pearce concluded that Nova Scotia should supply Quebec with coal, and Ontario as far west as Hamilton. From there to Port Arthur there is a gap that might still have to depend upon coal from the United States.

Mr. Wanklyn, fuel controller for Quebec, remarked that if we are to be a full-fledged nation, we must have our own fuel supply. We can solve our problem if we tackle it. He urged the Institute to represent to the government at Ottawa that they must support the investigations recommended by the Fuel Board. "We are living on a volcano," he said. Coal at \$18 to \$20 is a luxury that Canadians cannot afford. To avoid this undue expense we must see that our populace is educated in the way of using the other fuels that cost less.

Mr. Guy Toombs, of Montreal, who is a specialist in freight traffic remarked that the fuel problem must be solved by ourselves, the private citizens of Canada, rather than by our government. He presented an estimate to show that Alberta coal can be landed at Georgian Bay ports at a freight cost of \$6.60 a ton. The present grain rate from Drumheller to Port Arthur is \$5.00 a ton, and coal could be handled somewhat more cheaply, say at \$5.00 a ton. Boat freight should not exceed 60 cents a ton, and handling at either end, 50 cents a ton. With a mine cost of \$2.00, the total at Georgian Bay ports would be \$8.60. This calculation is similar to that of Mr. Butler, except that it is based on existing rates, susceptible of some improvement if the traffic were of large dimensions.

Mr. Clayton D. Dean, of the Imperial Oil Company outlined in his paper on "Fuel Oil as an Aid to Civilization," the place of oil in heating. Oil is the highest form of fuel and is suited to certain special uses, for which it is invaluable. Its use for steam raising on board ship is now well established. For heating offices and public buildings it has been used with some success, but for private dwellings its use is limited.



### Coal from the United States

The liveliest discussion of the meeting centred round the paper of Mr. Geo. H. Cushing, representative in Washington of the Wholesale Coal Dealers' Association. Mr. Cushing pointed out the curious fact that Canada and the United States, with 70 percent of the world's coal supply between them, each has a Fuel Board at present for the purpose of investigating fuel supply. He argued that the present conjunction of circumstances that has led to a shortage of coal is accidental and will not recur. The coal mines of the United States are now perfectly equipped and well developed, and it is inadequate railway facilities only that prevent abundant supplies from coming to Canada. When these are improved, or when the cheaper water-routes are used to better advantage, Canada will be able to draw at will on her neighbor's huge supplies of both anthracite and bituminous coals, and for an indefinitely long time. As for an embargo on coal that is impossible, because the supply of Canadian newspapers might be cut off in retaliation, which would stop political propaganda in the newspapers — an impossible situation!

Mr. Cushing was perfectly frank about the desire of American coal producers to retain the profitable Canadian market of 22 million tons annually. If the water-borne coal of Wales undercuts them in price by 25 cents, they will cut 50 cents. If the Nova Scotian collieries lower their prices 50 cents, they will go them another 50 cents better. If Alberta coal is offered at \$1.00 lower, the American coal will be cut \$2.00, if necessary. Mr. Cushing decried too much emphasis upon international boundaries where trade is concerned, and pointed to Europe, where there is a free international trade in coal. He assured the meeting of a continuance of the same friendly attitude of his countrymen of the United States towards Canadians as has been to our common advantage in the past.

In replying to Mr. Cushing's arguments, Mr. W. R. Wilson pointed out emphatically that each and all of the points he had brought forward provided added incentive to Canadians to make themselves independent of outside sources of fuel supply. The people of the United States are good neighbors, certainly; but they are putting the interests of their own country first, and as soon as it becomes to their advantage to cut off the export of coal to Canada, they will not hesitate to do so. The American is the last man to excuse in a neighbor undue dependence. It behooves us to be up and doing, to make ourselves independent. Mr. Cushing acknowledged these remarks by saying that, if anything he had said had the effect of stimulating a spirit of independence among Canadians, he thanked God for it.

### Welsh Coal, and Anthracite

Mr. J. F. K. Brown, now chief engineer for the Hudson Coal Company of Scranton and formerly a member of the war-time fuel commission at Ottawa, was unfortunately not able to present in person his masterly survey of the "Relationship of the Anthracite Fields to Canada." His conclusion is, in brief, that anthracite is a luxury fuel, and its price is bound to rise year by year as the cost of mining it increases. This is a fact that cannot be overcome, despite our best endeavours. Gradually this enhanced price will force consumers, first in Canada and then in less remote regions to use cheaper and possibly less convenient

fuels. This change will be gradual, rather than the result of any radical move or any sudden charge.

The Monmouthshire and South Wales Coal Owners' Association sent a paper on "British Fuel for the Canadian Market." This contained a brief description of the Welsh coal fields and mining industry and intimated that plenty of coal is available for us there, if we wish to make use of it. It was stated also that if the Canadian market proved suitable, this Association might establish a permanent depot in this country.

Mr. Coombe, of the Engineering Institute of Canada, told the meeting of the arrangement made by their Montreal branch to take up the study of fuel where the Mining Institute left off; that is to investigate the uses of fuel with a view to improving furnaces and boilers and methods of firing and in general to make more rational use of the fuel available. He assured the Mining Institute of the hearty coöperation of the Engineering Institute in this investigation concerning fuel, and suggested that both might conduct campaigns of education on the basis of their findings.

### The Quebec Gold Field

Prospectors and fish were prominent in the excellent series of lantern slides with which Mr. J. W. Evans illustrated his paper on "A Preliminary Prospecting Trip in Northern Quebec." He pointed out that this is by no means a poor man's gold camp, as much expensive work is necessary to develop and prove a claim. The area over which gold is known to occur is almost, if not quite, as large as the adjoining area in Ontario, though very little work has been done on it so far. Two diamond drills are now at work in Rouyn township. Mr. Chadbourne, who was present at the meeting, mentioned that a small mining plant is being installed on the Powell claim in which he is interested.

The pending rush into the district in the spring provoked some discussion as to the best way of approach. Mr. Evans advocated the canoe route down the Kinojevis river from the Transcontinental railway near Amos. Mr. T. C. Denis pointed out that a summer road from Lake Temiskaming is already built as far as Micmac, and will be extended as far as Lake Opasatika, whence there is a good water-route into the gold area. Thus it would appear that the branch recording office it is proposed to establish will be placed at a convenient centre on Lake Temiskaming, unless it should be put in the gold area itself.

The question of forest fires, which are always a serious menace when the woods are full of men, some of them inexperienced and careless, was discussed and it was resolved that this question be brought to the attention of the proper authorities in Quebec. Mr. A. O. Dufresne, of the Bureau of Mines, Quebec, pointed out that all men entering the woods must now have certificates, which inculcate a sense of responsibility and serve as a check on carelessness. Mr. Denis said that it was intended to quadruple the present force of fire-rangers, if necessary, to prevent conflagrations.

Dr. H. C. Cooke, who mapped the new gold area last summer for the Geological Survey, described it briefly. There is an east and west band of Keewatin rocks four or five miles wide north of a band of sediments of the Temiskaming series, both cut by porphyry dykes. Already gold has been found at Lake Fortune on the western side of Boischatel township and on



Mr. Hiram Donkin's report for Nova Scotia showed a fairly satisfactory year during 1922, and indicated substantial progress during the present year. In addition to 5,558,574 tons of coal there was produced the following:

|                               |         |
|-------------------------------|---------|
| Gypsum, tons . . . . .        | 250,000 |
| Salt, tons . . . . .          | 4,250   |
| Motor fuel, gallons . . . . . | 246,600 |
| Gold, ounces . . . . .        | 870     |

Mr. Theo. C. Denis, and Mr. A. O. Dufresne of the Quebec Department of Mines were able to report a 15 percent increase in Quebec's output of minerals. There was no metallic production, as the copper mines had been closed down and there had been no market for Canadian chromite or molybdenite. The developments in the new gold region of northwestern Quebec provides hope for the future of gold mining in the province.

Mr. Thos. W. Gibson, Deputy Minister of Mines for Ontario, mentioned, as had Mr. Denis and Mr. Cook before him, the present coöperation of the Department of Mines throughout the country with the Dominion Bureau of Statistics in gathering information, to the benefit and convenience of all concerned.

Mr. W. R. Rogers, of the Department of Mines, Toronto, pointed to the fact that Ontario has at last overtaken California in gold production, being \$6,000,000 ahead in 1922, and last year produced as much gold as Australasia. Ontario and Quebec now have a common interest in the two gold belts on which are situated the Porcupine and Kirkland camps. Among the present prospects in Ontario, the Goldale, Newray and Rochester are notable. The 15-page report presented by Mr. Rogers contains a table giving the annual and total productions to date of the various silver camps in Ontario, since 1904, here published for the first time. The total is well over 330 million ounces.

No report was made from the other provinces.

#### Wood Fuel

The first paper of the symposium on fuel was read by Mr. Rolland D. Craig, of the Forestry Branch, Ottawa. Mr. Craig pointed out that in the more thickly settled parts of Ontario and Quebec, where the soil is almost all useful for cultivation, even the agricultural communities are now dependent on fuel brought from afar. A wood-lot, if perfectly managed, can produce as much as one-half cord of wood per acre annually; but few wood-lots are thus cared for. As a cord of wood is the equivalent of a ton of coal, and as it takes about 15 tons of coal a year to heat the average house and do the cooking, a wood-lot must be at least 30 acres in extent to serve a farm-house from its annual growth. Only farmers with rocky or sandy land can afford to keep so large an area under trees.

On the outskirts of settlement and in the rocky areas that will remain permanently wooded, there is an entirely different case. In the areas now being cut over for timber and pulp-wood, there is a large proportion of hardwood, most of which is wasted at present. This could be turned into charcoal readily if there were a market for it. Mill refuse, which constitutes over one-quarter of the saw-log, is now burned merely to get rid of it. The briquetting of sawdust and similar small refuse has been accomplished commercially, and many provide a first-rate fuel from this hitherto useless material.

In relation to the total need for fuel, the available supply of wood fuel is small, and the best it can do is

to supply communities in favourable localities and to supplement other supplies. In this connection Mr. Thos. W. Gibson told of the unprofitably cord-wood venture of the Ontario government during the coal famine of 1918, when it was found very difficult to get people accustomed to anthracite to use any other fuel.

#### Lignite

After 45 years of mining, the annual production of lignite from the extensive beds in Saskatchewan is 350,000 to 400,000 tons, 90 percent of it coming from the Souris valley. The paper by Mr. R. J. Lee, chief Inspector of Mines for Saskatchewan for the Federal administration, summarised the resources, their present use, and the experiments conducted with a view to extending their use. It is the cheapest coal in Canada, averaging \$2.40 per ton at the mines. Much of it is won in open cuts, by steam shovel. The experiments at Bienfait with a view to improving the quality by low temperature carbonization are still in progress, and there is hope that they will be ultimately successful.

Dr. D. B. Dowling, of the Geological Survey, who is well acquainted with the field, pointed out that owing to the 33 percent of water in lignite and its inability to stand shipment or storage, Alberta coal now holds the field in Saskatchewan and Manitoba. If the carbonising and briquetting plant becomes commercially feasible, the high-grade fuel might stand shipment well into Ontario.

#### A Keen Analysis

In opening on Thursday morning the session of which he was chairman, Dr. W. H. Collins, Director of the Geological survey, gave a very thoughtful résumé of Canada's fuel problem as he sees it. During the last 25 years the population has increased 80 percent, the railway mileage, 120 percent, and the manufacturing industry, 700 percent. It is this rapid change from unspecialized pioneer conditions to a highly organized industrial community that has brought in its wake the fuel problem. The mechanical energy required is in proportion to the degree of industrialization. In 1900 we required 8 1/3 million tons of coal; in 1921, 31 million tons, an increase of 275 percent. In 1900 we used 1 1/2 tons of coal per capita; in 1922, 3 1/2 tons.

This rapid increase in the use of coal involves a diminishing ratio between the visible supply and the demand. It may be that the present shortage indicates that, in view of this diminishing ratio, the producers are protecting their supplies and enhancing their profits. Whatever the reason, the situation for us is grave. There may be no shortage next year, but unless we modify the sources of our fuel supply, it is certain to recur periodically. The remedy will be brought about by operators in the various districts and large consumers when they are convinced that the demand for fuel is permanent and that it can be satisfied at a profit. An emphasis of the permanency of the need may hasten this solution, and the duty devolves upon the Institute of helping by an emphatic statement. The Lignite Utilization Board, the Advisory Research Council and the Dominion Fuel Board are likewise agencies whose duty it is to conduct well-founded campaigns of propaganda and education, along with the Institute, to aid in the solution of the fuel problem.

Dr. Collins concluded by pointing out that the In-



secretary had been fortunate in securing such well informed speakers to contribute to its symposium on Fuel.

### Dominion Fuel Board

A general discussion of Canada's fuel problem was commenced by the paper by Mr. B. F. Haanel, of the Mines Branch, Ottawa, and a member of the Dominion Fuel Board, on "The Fuel Situation in Canada." This paper reviewed the sources of heat energy available and their distribution, and the conclusion was that within the "acute fuel area" in Ontario and Quebec, no single expedient will solve the problem. It will be modified, however, by the transportation eastward to the economic limit of Alberta coal, by the use of peat, by the substitution of coke for anthracite and by the increasing use of hydro-electric energy for power purposes in place of coal, as well as by the more economical use of fuel, both in the home and in the power plant.

Dr. Charles Camsell, Deputy Minister of Mines at Ottawa and chairman of the Dominion Fuel Board, outlined the case as it appears at present to that board, and announced the program the board has formulated and for the application of which they have applied for funds to the federal government. The board proposes that competent authorities be engaged to investigate three major problems:

1.—To determine the economic maximum annual production of which the Nova Scotian coal fields are capable. Mr. F. W. Gray estimates that there is a maximum of 5 million tons annually available for the use of Quebec and Ontario. Though this is five times the present supply from that source, it is much below the total required in that district. Though Mr. Gray is the best authority on this matter, the board considers that an independent investigation should be made.

2.—To investigate the possibility of converting bituminous coal into coke for domestic use. Last fall Dr. Camsell visited St. Paul and Minneapolis, where the anthracite formerly in use universally has been replaced almost entirely by coke, which is made in by-product coke ovens turning out 225,000 tons per annum. Coal at the coke-ovens costs \$12.50 per ton, and the coke is sold at the same price, the gas and other by-products making this profitable. To introduce the use of coke rapidly among householders 15 or 20 young fuel engineers were engaged as demonstrators, and their work proved very effective.

3.—To demonstrate the eastern limit to which Alberta coal can be shipped profitably. It has been shown that Alberta coal can compete favourably with coal from the United States in Winnipeg, but the markets farther east remain to be investigated.

Dr. Camsell concluded by remarking that the prejudice in Ontario and Quebec against peat, the only fuel available locally, must be overcome. Each and all of us must aid the home producer to the best of our several abilities. The series of papers on fuel presented at these meetings is, he said, a great aid to the Dominion Fuel Board.

### Bituminous Prices are Robbery

Dr. E. S. Moore, professor of economic geology at the University of Toronto, next drew on his long experience in the coal fields of Pennsylvania to bring out some important points. Though some important new reserves of anthracite coal have been determined

lately below the 3,000-foot level, he judges that 25 to 30 years from now no more anthracite will be available for Canada, as all the output will be required then in the United States. The obvious conclusion from this is that we Canadians should proceed at once to develop an alternative supply of domestic fuel. Bituminous coal, from the United States or elsewhere, will remain the chief fuel. But this must be converted into a high-grade fuel by coking. Coke can be sold profitably at the cost per ton of the coal from which it is made, the value of other products, such as motor fuel, gas and ammonium sulphate, making up for the expense of coking.

The present price of anthracite in Ontario (\$16.50 per ton) is, Dr. Moore stated, a fair price; but the present price of bituminous coal, which is the same to domestic users, is robbery. He estimates the cost of American bituminous coal in Toronto thus:

|                     |                  |
|---------------------|------------------|
| Mine cost . . . . . | \$2.00 to \$6.00 |
| Freight . . . . .   | 3.00             |
| Duty . . . . .      | .53              |

---

Total cost . . . . . \$5.53 to \$9.53

The discrepancy between these cost prices and the present selling price of \$16.50 per ton needs no further comment.

### Peat Fuel

Mr. Haanel's comprehensive paper on "Peat resources of the Central Provinces and their Utilization for Fuel Purposes" was supplemented by a series of lantern slides explained by Mr. E. V. Moore, engineer of the Joint Peat Committee, which has conducted the experiments at Alfred, Ontario, during the last four years. The experiments have resulted in the development of mechanisms that will produce a high-grade fuel at a cost to allow of their competing favourably with other fuels. The good quality of the fuel was amply testified by a number of the members that have used it.

Supplementing the information in his paper, Mr. Haanel explained that the object of the Peat Committee has been to demonstrate the use of peat as an auxiliary domestic fuel. Its use for power purposes may develop eventually. At Wilhelmshaven in Germany there is a steam plant of 20,000 horsepower fired exclusively with air-dried machine peat of a quality inferior to that made at Alfred. This peat competes in price with Welsh coal, which is available at a low price at that port. There is an unusually large content of fixed nitrogen in most Canadian peat, and eventually it may be advisable to save this by carbonising the air-dried peat, the remainder to be briquetted into fuel of the highest grade. In any case, an effective process for making air-dried peat is the first step, and in this the work of the Peat Committee has put Canada today in the lead throughout the world.

### Alberta — the Coal Bin of Canada

Mr. W. J. Dick, manager of a group of collieries in Alberta for North American Collieries, Limited, was not present to give his paper, an Economic Study of Coal Mining in Alberta and Southeastern British Columbia; so a synopsis was read by the secretary. Alberta, the "coal bin of Canada", has a million million tons of coal. The mines opened at present can supply three times the quantity used in the present markets.



various claims in Rouyn township. A few sills cutting the Temiskaming series had been determined, but not many. More detailed work is to be conducted during the coming summer.

Dr. Ami drew attention to the fact that the great "Huronian" belts of rocks as determined by the early geologists had proved to be productive of minerals, according to their prediction. In this connection he pointed out that the Canadian catalogue of scientific literature, formerly published annually by the Royal Society, has been dropped, and that this volume, so useful at home as well as abroad, might well be revived. It is possible that the former government subsidy of \$2,500 might be renewed were the volume again printed in Canada.

### Rock Drills and Researches

"The Evolution of Rock Drilling" was described by Mr. H. A. Burbank in a paper illustrated by a series of lantern slides. The modern rock drill began its career on this continent about 50 years ago as a rather crude appliance, with much the same outward form as the present piston drill. A radical change was made by the inventions of Leyner twenty years ago, which have resulted in the present hammer drill in its various forms.

Messrs. Elsworthy and Carnochan, of the Mines Branch, Ottawa, described their recent research in a paper, "Investigation of the Economic Value of a Fossil Resin from British Columbia." This resin is different from amber in the fact that it contains less succinic acid, and its physical properties make it unsuited to the ordinary uses for amber. It makes a varnish that is excellent but for its dark colour. The resin occurs in a coal seam at Coalmont, B.C. It is readily separated from the coal after crushing to 20 mesh by floating it off in a brine solution. This research, though it has not as yet resulted in findings of economic importance, illustrates the opportunities that lie on every side in the study of non-metallies.

"Notes on the Welding of Iron and Steel with the Electric Arc" was illustrated by Mr. F. H. Williams by an unusually fine series of photographs and micro-photographs of welded joints, and demonstrated the prime importance of painstaking and minute investigation in an industrial process such as this. Mr. Williams showed that with proper care and proper materials the electrically welded joint can be made almost perfect. Slag-coated welding rods are preferable to bare rods. Good steel plate must be used if a good weld is to result, as imperfections are accentuated by the recrystallizing induced by the heat of welding, which penetrates to a depth of 1/16 inch. Acetylene welding induces recrystallization for a distance of 1 to 4 inches.

### Maps and Miners

The value of topographic maps is appreciated now much more than formerly by the mining fraternity, said Mr. A. C. T. Sheppard of the Topographical Surveys Branch of the Geological Survey in his paper "Topographical Mapping and its Relation to the Mining Industry." Mr. Sheppard pointed out that a topographic map of suitable scale and style should precede each stage of mining development. The prospector entering virgin territory should have the preliminary map on a scale of 8 miles to the inch, showing the water-routes, and the principal topographic features by means of sketch contours, and the main geological

features. Next comes the map on a scale of 4 miles to the inch, which should precede intensive prospecting and preliminary mining development. This has surveyed contours, and shows trails, portages, etc., and more detailed geology than the first map. It can be used to aid in the location of roads and in railway reconnaissance and is of general use to the mining geologist and miner. As mining development proceeds, a high-grade map is required, and this is provided by the map on a scale of one mile to the inch showing both the topography and the geology in great detail. Here the public responsibility for mapping generally ends, as this map serves all requirements except for engineering projects. For this latter purpose maps (or plans) on a scale of 200,400 or 1,000 feet to the inch are used, all data being determined accurately by measurement, in distinction to the estimates and interpolations allowed on the former maps. Occasionally these plans are made at public expense for special purposes.

In conclusion, Mr. Sheppard pointed out that maps should be kept abreast of, but not ahead of, the need for them. Each map should be judged and used in relation to the purpose for which it was made; for instance an areal map should not be used as a basis for railway reconnaissance or as a guide for detailed prospecting. Geological and topographic information are very closely inter-related. The demand for high-grade maps is increasing very rapidly as mineral development proceeds.

The discussion following this paper brought out the fact that the various surveys departments (of which, as Dr. Ami pointed out, there are, or were recently, no fewer than fifteen in Ottawa) are not making full use of the aeroplane as an adjunct to their work. War-time experience demonstrated the marvellous accuracy and rapidity of this means of map-making. A motion was passed resolving that this matter be brought to the attention of the proper authorities in Ottawa, with a view especially to providing maps for the use of prospectors in advance of the progress of topographic surveys on the ground. It was pointed out also that the average prospector or mining engineer is still not fully aware of the vast amount of useful information available to him in Ottawa, and it was urged that means be developed to make this storehouse of information more adequately known to the public.

### Ball Mills in Action

The technical sessions were concluded by moving pictures showing the action of ball mills, which have been made during the progress of research in Toronto University by Prof. H. E. T. Haultain and Mr. F. C. Dyer. The three reels are a continuation of the series shown last year, and they illustrate vividly the genuine utility of this method of investigation. Both balls and discs were used in these experiments, dry and in water, and the use of two sizes of mill showed that a small mill simulates closely the action of a larger one. The coöperation of the Ontario government and the Film-craft company has made possible the progress of this fundamental research.

The three evenings of the meetings were well used. During the first Mr. W. S. Rugh, of the Consolidated Mining and Smelting Company, showed moving pictures illustrating the mining and smelting of zinc-lead-silver ore from the famous Sullivan mine. Mr. E. S.



Wilson gave in moving pictures "The Story of Compressed Air." On Thursday a boxing bout entertained those attending the annual "smoker" and concert. The banquet on Friday evening was the final event.

### The Banquet

The guests of honour at the banquet were Hon. Jacob Nicol, provincial treasurer of Quebec, Hon. Harry Mills, minister of Mines for Ontario, Mr. E. P. Mathewson, president of the American Institute of Mining and Metallurgical Engineers, and Dr. Bradley Stoughton, of New York. In his valedictory speech, Mr. Wilson dwelt again upon the opportunities Canada offers to young mining engineers and upon the duty each engineer owes to the industry through common and vigorous action as members of the Institute. An appreciation of Mr. Wilson's notable services to the Institute, both during his presidency and formerly, was voiced by Col. J. J. Penhale and Prof. J. W. Bell. Mr. Wilson introduced as the new president, Mr. J. A. Dresser, who stated his conviction that the Institute could, and would, render signal aid to the country in the difficult times that are ahead of us.

Mr. Mills, in replying to the toast to the guests, pointed to the recent rapid growth of gold mining in Ontario as an earnest of the future greatness of the industry. He affirmed the determination of his government to do all in their power to prevent "wild-catting" and to aid prospectors in every way possible, and paid a tribute to the excellent work being done by the Ontario government geologists.

Mr. Nicol emphasised the aid that road-building in the outlying districts gives to mining development and mentioned the comprehensive plan adopted by his government. Quebec, he said, has now good mining laws, calculated to stimulate and aid mining development. As for experimental legislation, he and his confrères are willing to wait until others have proved or disproved their theories.

### The Resolution on Fuel

The culminating point of the meetings was the resolution addressed to the Federal government, and passed unanimously, as follows:

"Whereas the inadequate and unsatisfactory supply of fuel for central Canada cannot be viewed with other than national concern. The shortage this winter has been experienced before, and is bound to repeat itself as long as present conditions remain.

"Whereas the importance of wood, peat and electricity, while not to be ignored, is in effect, an auxiliary factor only, and cannot seriously be considered as a substitute for coal. Eastern and Western Canada have the necessary coal deposits to satisfy fully, every requirement of Central Canada. Our railways are demanding increased traffic; and moving Canadian coal to meet our own necessities will supply them with tonnage, and relieve Canada's dependence on a foreign supply.

"Whereas the proper solution of many of our national problems is dependent upon scientific and industrial research, and one of the most crucial problems facing Canada today is this steadily increasing necessity of providing our own fuel requirements from our own resources; and

Whereas this Institute has been informed that the Dominion Government has appointed a Fuel Board to study and report on this problem—

"Therefore, be it resolved, in this annual meeting assembled, of the Canadian Institute of Mining and Metallurgy, that we voice our complete accord with such action, and express the hope that the report of the Fuel Board will result in the appointment of a Commission of Engineers, empowered to investigate in a practical way the entire problem of transporting and marketing Canadian coal to such areas as are today dependent upon foreign supplies, in the belief that transportation is the most important factor in the problem."

This resolution has now been placed in the hands of the government at Ottawa. If it has the influence on these administrators that it is designed to exert, the serious efforts of those that contributed time and energy to the annual meeting of the Institute will have been well rewarded.

### LETTERS FROM READERS

#### Mr. Mathewson and the "Journal"

To the Editor,  
Canadian Mining Journal.

Sir:

In the account given in the Montreal "Gazette" of March 10th of the speeches made at the annual banquet of the Canadian Institute of Mining and Metallurgy the preceding evening, the following paragraph appears:

"The rest of the meeting was devoted to a toast to the guests, proposed by E. P. Mathewson, president of the American Institute of Mining and Metallurgy, and other felicitous speeches. Mr. Mathewson termed himself the first Canadian-born president of the American society. His main thought was devoted to the publication, fostered by the Canadian Institute, of which he said: 'They have tried to steal your birthright and substitute for it a mess of pottage.' This referred to an attempt at the convention to forego the monthly bulletins of the Institute, and replace them by weekly space in the Canadian Mining Journal."

Such a statement must have been made in a moment of irresponsibility, and must not be allowed to go uncorrected.

Mr. Mathewson is not the first Canadian-born president of the American Institute. Dr. James Douglas, born in Quebec in 1837 and educated at Queen's University, was twice president of the American Institute. None knows this better than Mr. Mathewson. Speaking in Colorado in September, 1918, of the great work Dr. Douglas did for mining and metallurgy, Mr. Mathewson is credited with the following reference:

"Dr. Douglas was particularly thoughtful of his Canadian fellow countrymen and especially those who were engaged in scientific and educational work. Altogether the sums given by him during his lifetime to Canadian institutions would be probably up in the millions; but he was so unobtrusive and so retiring in his disposition that he seldom allowed his name to be used in connection with those matters. Anywhere in Canada, if you mention the name of 'Douglas', you will find people who will say at once, 'That was a great Canadian, a man we all revered'."

What a difference between the speaker on that occasion and the man he was extolling! Dr. Douglas did a big work for the land of his birth, and it will take many more than five years to efface from the memories of Canadians the recollection of the place he occupied. But, we ask ourselves, what has Mr. Mathewson done



for his native land that his fellow countrymen should experience a thrill of pride when he proclaims himself the first Canadian-born president of the American society? We refrain from discussing this question — for Mr. Mathewson was born in Canada, after all.

Now, what about this institution, the "Canadian Mining Journal", which Mr. Mathewson went out of his way to slander? This is one of the institutions for which Dr. James Douglas is largely responsible.

In 1907 the "Canadian Mining Review" was about to be purchased by an American contemporary. The prospect of the Canadian mining industry being left without a publication controlled by Canadians aroused some interest. The matter was brought to the attention of the writer by Dr. W. G. Miller, Provincial Geologist of Ontario, who suggested that a syndicate of Canadians should be organized to take over the "Review". The first man the writer sought for advice on the proposal was the late Dr. Douglas, who endorsed the suggestion and gave his cheque for part of the purchase price. This investment still remains in the company that owns the "Canadian Mining Journal". With this start the syndicate was formed, the "Review" purchased, the name changed to the "Canadian Mining Journal", and the foundation laid for the educational work that has since spread to all the other basic and essential industries of Canada.

Now, what about this "Bulletin" for which Mr. Mathewson professes such a high regard and such fond hopes? In the writer's experience (and he has kept in fairly close touch with the mining industry since 1907), there is only one occasion on which he can associate Mr. Mathewson with the "Bulletin" of the Institute. That was in 1917, when a small group of mining men, of whom Mr. Mathewson was one, met in Toronto to consider ways and means of keeping the "Bulletin" in print. On that occasion Mr. Mathewson did not offer to contribute one dollar. It was the owners of the "Canadian Mining Journal" that undertook to carry the "Bulletin" until the end of the war, which undertaking cost them over five thousand dollars. Last year the effort to keep the "Bulletin" in print cost the Institute a deficit in its funds of between nine and ten thousand dollars, and this year the deficit will be in the neighborhood of seven thousand dollars.

The offer that Mr. Mathewson referred to in such contemptuous terms was free space in the weekly issues of the "Canadian Mining Journal" for the publication of the material now appearing in the monthly "Bulletin". This would save the Institute from the annual loss it is now sustaining and at the same time would leave the secretary, who is now spending most of his time in editing the "Bulletin", free to do work of greater importance to the mining industry. Was there anything wrong in such an offer? Mr. Mathewson has made no offer. He is content to sit back and sneer at the suggestions of others. It was, moreover, obvious that Mr. Mathewson was not very serious in his attention at these meetings. He and his "fidus Achates", Mr. J. C. Beidelman, were conspicuous for their irresponsible interruptions at the initial session the only technical session they attended. This was hardly a service to the institute, or a proper example to the numbers of students who attended.

The Canadian Institute of Mining and Metallurgy and the "Canadian Mining Journal" are Canada's only two national mining institutions. To the outsider they reflect the size, importance and prestige of the mining industry and to those within the industry they give the best service their means will permit. Neither is bigger nor better than those in the industry make it. They

date back, the Institute for 25 years and the "Journal" for 40 years, and both represent the accumulated efforts of a long line of illustrious Canadians. Each has had a hard struggle against the domination of its older and wealthier contemporaries in the United States; but both are emerging from the struggle strong and vigorous. The "Canadian Mining Journal" now rests upon the secure foundation of a well established publishing business. It is published weekly, is well edited, and is giving a service to the industry that is generally appreciated. It always welcomes constructive criticism, but resents gratuitous slander.

The American Institute of Mining and Metallurgical Engineers is well thought of in Canada. The relations between that Institute and the Canadian Institute and the "Canadian Mining Journal" have always been most friendly, and the writer would be sorry to do or say anything that would give the least offence to the members of the former organization. When he read Mr. Mathewson's slanderous comment, the writer credited it to an irresponsible condition. If that is so, Mr. Mathewson has not had the grace to publish or offer an explanation and his statement cannot be allowed to stand unanswered.

Gardenvale, Que.

J. J. Harpell.

## ENGLISH CAPITAL AND ONTARIO GOLD MINES

The following extract from a recent number of "The Mining Journal," London, throws an interesting light on the reason why English capital has not been invested more largely in the Ontario gold industry:

"Under these circumstances it is certainly remarkable that gold mining prospects in Canada have not attracted general attention in this country. Conditions, of course, are not what they were before the war, and New York is much nearer than London; but when due allowance is made for these conditions, we cannot help the conclusion that there is far less enterprise existing at the present time among those connected with mining than was the case at the beginning of the century. The chief reason is no doubt the disappearance of the numerous smaller interests and the domination of the position by a few big groups more or less inter-allied. Inevitably the policy of such big concerns is to refuse prospects out of which small syndicates in the past might have done well, and take up only those which are capable of early flotation at high capitalisations, so as to secure a large and rapid profit on the turnover. In the end a policy of this kind, while profitable perhaps to the individual group, must be very restrictive of English enterprises in gold mining. We gather that at length somewhat more attention is being paid to Canada by the big gold mine promoting interests here, but considering that Ontario is British territory not more than a week distant from London, the evidences of a realisation of the potentialities of the situation are most disappointing."

The domination of the industry by big interests is well illustrated on the Rand where one mining house is said to control 50 per cent. of the mines and another 25 per cent. "Early flotation at high capitalisation, so as to secure a large and rapid profit on the turnover" cannot be accomplished so easily in a country where the industry is in its early stages.

During 1922 the coal mines of Belgium produced 92 percent of their pre-war output.



## A NEW ZINC PROSPECT\*

By F. J. ALCOCK.

The following report comprises a brief description of a property near the town of Renfrew, Ontario, on which zinc ore was found during the past summer. One day was spent by the writer on the property in October in company with the owners.

The prospect is situated on Lot No. 2 of the 3rd concession of Aldmoston Township in the County of Renfrew, approximately in the centre of the lot. It lies at a distance of less than four miles from Renfrew and an automobile can be driven right to the property. The owners are Messrs. William Dean and Joseph Legree, both of Renfrew.

### Geology

The general geology of the region is covered in a report by R. W. Ellis, "On the Geology of a Portion of Eastern Ontario," forming Part J of the Annual Report, Vol. XIV of the Geological Survey of Canada. More recent work has been carried out by M. E. Wilson, of the Geological Survey, in the seasons of 1918 and 1919 and a report by him on the district will be prepared in the near future. The following notes on the regional geology are largely from information supplied by him.

The solid rocks of the region are all of pre-Cambrian age and consist of sediments and igneous rocks cut by granite-gneiss and its differentiates. The sediments belong to what is known as the Grenville series of early pre-cambrian age. The commonest type is limestone. In this area it is white on the freshly broken surface, commonly weathering brownish, and is quite coarsely crystalline. A very characteristic feature is the presence throughout it of numerous rosettes and rods of tremolite. Associated with the limestones are bands of quartzite and fine-grained sedimentary gneiss which represent metamorphosed elastic beds which were deposited with the limestones. Two small areas of these rocks are visible near the zinc prospect.

The igneous rocks associated with the limestone consist of hornblende schists which in the immediate vicinity of the prospect underlie the limestone. They were originally either basic lava flows interbanded with the limestones or eruptives which have been intruded into them. The original character of these basic igneous rocks has been changed completely by the intrusion of the granites of the region. They are now black rocks whose freshly broken surfaces show a glistening appearance due to the cleavage faces of the hornblende crystals.

All these rocks are intruded by granite-gneiss. This rock is pinkish in colour and in composition is a biotite-granite. Certain phases are coarser grained and have been differentiated as pegmatite. These rocks have come up from great depths below the surface of the earth, thrusting through the older sedimentary and volcanic rocks. The heat and pressure accompanying their intrusion have highly altered these older rocks.

### Ore Deposits

The zinc ore lies in the Grenville limestone. One main trench twenty feet long and about ten feet deep running in a direction N 60 deg. W has been opened up and in two other places a little exploration work has been done. In the main trench is a good showing of zinc ore. The ore is sphalerite of a brown colour and resinous lustre. The commonest variety consists

of small grains disseminated through the recrystallized limestone, but small stringers of pure sphalerite are also locally found. A chemical analysis by Mr. Conner of a piece of the purest sphalerite that could be obtained gave the following results:—

|                                   |                |
|-----------------------------------|----------------|
| Iron, . . . . .                   | 3.36 per cent  |
| Zinc, . . . . .                   | 62.48 per cent |
| Sulphur (by difference) . . . . . | 34.16 per cent |

100.00

The disseminated ore shows considerable variation. In places there is a distinct banded effect with a strike of N 30 deg. E and a steep dip to the northwest. In the middle part of the trench are zones in which the disseminated ore consists largely of grains of sphalerite with only minor amounts of calcite. An assay of a specimen of the better grade of ore of this variety gave 37.02 per cent. zinc. In other places in the trench the recrystallized limestone contains only sparsely scattered grains of zinc blende. Small amounts of galena are also present. It is more abundant at the northwest end of the trench. An interesting feature in connection with the galena is a bluish tarnish visible on the cleavage surfaces. Iron pyrite is present in small amounts and a little chalcocopyrite is also to be found. At the west end of the trench rosettes of tremolite are very abundant in the recrystallized limestone. Sphalerite, galena, hydro-mica, chalcocopyrite and pyrite are found disseminated throughout this tremolite-calcite rock. At the eastern end of the trench some narrow veins of pink calcite traverse the limestone and carry small quantities of zinc blende. The deposit shows no definite boundaries and is irregular in both composition and structure. A grab sample consisting of chips taken from both faces along the entire length of the trench contained 9.95 per cent. zinc.

About 1200 feet northeast of the main pit a small amount of development work has been done on another outcrop of ore. The mineralization is here similar to that in the main pit. The limestone has been recrystallized into calcite and tremolite through which is disseminated sphalerite. The tremolite occurs both as feathery rosettes and also in good crystals which are colourless, white or grayish. The amount of ore exposed in this open cut is less than that in the main pit.

A third trench has been opened up about 200 feet southwest of the main trench. This shows recrystallized limestone with sparsely disseminated sphalerite and also some small veins of sphalerite.

### Conclusion Regarding the Deposits

The deposit is a contact metamorphic deposit formed by the action of the granite during its intrusion into the limestone and accompanying rocks. The limestone was apparently recrystallized with the production of calcite and tremolite and later solutions from the granite carrying sulphides impregnated the limestone. Almost identical deposits of zinc ore have been mined in the vicinity of Notre Dame des Anges, Portneuf county, Quebec. A detailed description of the various properties which have been developed in that area is given in the "Report on Mining Operations in the Province of Quebec during the year 1915." The quality of the ore in the Renfrew prospect as shown in the main pit is undoubtedly good. The property is very conveniently situated for mining operations. A railway siding is within 1 1-2 miles of the property and the power line from Calabogie to Renfrew crosses immediately over it.

\* A report submitted by Dr. Alcock to the Director of the Geological Survey, Ottawa, and published with his permission.



#### FOURTH REPORT OF JOINT PEAT COMMITTEE

The Department of Mines, Ontario, has now issued as Part IV, 1922, the "Fourth Report of the Joint Peat Committee," by B. F. Haanel, Secretary. Copies of this report were issued to the press as soon as it was passed by the Committee in December last, and there was a considerable amount of public discussion on it. It shows that an economical method of manufacturing peat has been developed, and recommends that the Committee be empowered to demonstrate its feasibility during the season of 1923. This recommendation was not adopted, however, and the future of the plant at Alfred, Ontario, and the process there developed is still uncertain. The report of 28 pages is well illustrated with photographs and a diagram.

#### ONTARIO MINES REPORT

Part I, Vol. 30 (1921) of the Ontario Department of Mines is now available for distribution. It contains the Statistical Review and the Mining Accidents for 1920, as well as the annual account of Mines in Ontario, Instruction Classes for Prospectors, the Third Report of the Joint Peat Committee, and Notes on Clay of the Missinaibi River, by Joseph Keele. The description of the mines of the province comprises 96 pages of condensed information as to mining operations and personnel, as well as numerous photos, plans and flow-sheets. The report on the prospectors' classes conducted in various centres where prospectors congregate during the winter mark the resumption of similar classes carried on fifteen to twenty years ago.

#### FORMIDABLE COAL RESERVES OF THE RUHR BASIN

In connection with the French seizure of the Ruhr district, the Temps (Paris) publishes an article explaining the resources and the conditions prevailing in that region. First of all, the Ruhr derives its prosperity mainly from its coal and lignite. Then, as a consequence of the gigantic coal exploitation, the entire district has become the center of hundreds of other industries, financial as well as manufacturing.

The coal extends over an area of 2900 square kilometers, and its visible reserves are estimated at 54,300,000,000 tons. At a level of 700 metres the amount is calculated at 11 billion tons, between 700 and 1000 metres 18,300,000,000 tons, and between 1000 and 1500 metres 25 billion tons. The probable reserves lying lower than 1500 metres are estimated by one authority at 75 billion tons and by another at 213 billion tons.

It would be possible to extract 100 million tons annually during 764 years to a depth of 1500 metres, or 674 years at a depth beyond 1500 metres, before exhausting the supply of good quality coal, and there would remain enough of inferior quality coal for 678 years. Accordingly, there is justification for Professor Frech's estimate that the Ruhr could yield 100 million tons of coal annually up to the year 4031.

As regards lignite, its reserves are estimated as being something more than four billion tons.

The exploitation of the Ruhr basin changed the entire economic life of Germany. The eastern coal regions of France, which had their great importance prior to 1871, had to drop to second place. It was on the coal of the Ruhr that the German "heavy industry" and the Prussian political power established their hegemony.

The city of Hamborn had 1396 inhabitants in 1871, but 110,803 inhabitants in 1920, thus showing an increase of 7937 per cent. Essen in the same period increased from 51,513 to 439,257. Dortmund had 41,813, and now about 314,000.

In the early days it was with foreign machinery (English and Belgian), with foreign labor and with foreign capital that the Ruhr coal industry was placed on a practical basis. In later years practically all these elements became German, and the pioneers were succeeded by such chiefs as Haniel, Krupp, Kirdorff and, still later, Thyssen and Stinnes. —The Protectionist.

#### INDUSTRIAL ITEMS

A manufactured material composed essentially of Canadian asbestos that has lately been introduced on the Canadian market is "Ferodo" bonded asbestos friction lining. This is composed of asbestos yarn spun round fine brass wire and then woven into a stiff fabric. Where more than one ply of this fabric is required, each layer is woven securely onto the one next on either side, so that the resulting mass is very securely put together. The fabric is then compressed in hydraulic presses into a solid mass that is eminently suited not only for brake linings but for stair trends, etc. It makes the highest possible grade of brake lining, especially suited for use on vehicles and mine hoists, where human life often depends directly upon its efficiency. "Ferodo" is made in England and the Canadian agents are the J. C. McLaren Belting Co., Montreal.

The Canadian Mead-Morrison Company, Limited, manufacturers of hoisting and conveying machinery and labour-saving plants, whose head office is in the Canada Cement Bldg., Montreal, and whose works are located at Welland, Ont., have recently announced their appointment as distributors of the Cello Projector, a practical motion picture machine that has been made for some time at their American factory. This machine is specially adaptable for use in scientific demonstrations, accident prevention, health propaganda, lecture rooms, and so on, and may be found of use in the mining industry with these objects in view.

Fraser and Chalmers, of Canada, Limited, Montreal, have recently installed for J. R. Booth, Limited, Ottawa a turbo-alternator of 2500 K. W. capacity, to insure ample power for the plant during the season of low water. Some such installation might prove a decided economy in the northern mining camps, where power shortages have become chronic.

The Combustion Engineering Corporation, Limited, has been incorporated under a Dominion charter to manufacture and sell in Canada a number of well-known lines of fuel machinery. The new company intends also to establish a research laboratory with a view to solving problems peculiar to Canada. The members of the firm are Messrs. A. J. T. Taylor, Wilfred R. Wood, J. Farmer, and G. C. Usher, who are well and favourably known in Canadian engineering circles.

During the year 1922 over two-thirds of the foreign trade of the United States was carried in foreign ships.



# The Mining Districts

BY THE JOURNAL'S CORRESPONDENTS

## NORTHERN ONTARIO

**HOLLINGER.**—At the annual meeting of the Hollinger held in Montreal recently, the President advised the shareholders that the Ontario Government had promised the company one of two power sites on the Abitibi River. The Hollinger is to get either the Island Portage power, 76 miles from the mine, which has a capacity of 40,000 h.p., or the Long Sault power, 56 miles from the mine, which is capable of developing 25,000 h.p. Either one of these two powers is ample to take care of the mine's needs. The official letter from the Government, however, on which this statement was based, does not sound quite as definite as the announcement, but indicates that some decision will shortly be arrived at. Mr. W. E. Raney, attorney general of Ontario, wrote that the Hollinger would be given a lease on either one of these powers on terms to be settled by Mr. Rowell, so that while there is every expectation that the matter will be shortly settled, it has not yet been completed. Some disappointment was felt that the dividend rate of the company was not increased, but the president stated that at the present time, on account of the power shortage, the company was not earning the regular dividend and that it was not considered advisable to increase the rate now on account of an estimated expenditure of three or four million dollars on proposed power installation.

**DOVE.**—During the month of February, the Dove mill treated 26,190 tons, or an average of 935 tons a day as compared with 1200 tons a day in January. It is understood, however, that the average grade in February was the highest in the history of the Dove Mines, so that the total revenue will be much the same as January.

**KIRKLAND.**—The Teck-Hughes workings have been connected with the Orr at the 400-foot level, and some good ore has been opened where the connection was made. The February production of the Teck-Hughes was \$106,200, from which a very substantial profit should be realized.

The Wright-Hargreaves has completed its main shaft to the 1000-foot level, and will now proceed with an extensive development programme. If results at the 700, 850 and 1000-foot levels correspond with those higher up, the capacity of the mill will be doubled.

**SOUTH LORRAIN.**—The Keeley is now the second largest silver producing mine in Canada, its monthly output being exceeded only by the Nipissing. The production for January was 115,000 ounces and in February 152,000 ounces, and developments underground indicate that this rate can be maintained for a considerable time. The company has recently declared a dividend of 8 per cent. and the shares are shortly to be listed on the Canadian market. Two veins in particular continue to show very good values, the "N" shoot of the Woods vein having been drifted on for a length of 200 feet and averaging 370 ounces across 19 inches. On the seventh level on vein No. 26 the drift has been driven for a total length of 74 feet and averages 2600 ounces across 15 inches. Vein No. 20, which is a branch from the Woods vein, has also been cut on the seventh level where it shows 12 inches of high-grade ore.

**IMPORTANT COURT DECISION.**—A decision of more than ordinary importance has recently been given by Mr. Justice Galt in Winnipeg, in connection with a suit brought by officials of the Brotherhood of Locomotive Engineers against a former secretary. The former secretary was discharged in May 1921 at the triennial convention in Cleveland, but refused to give up his position, claiming he had never been notified that his services had been dispensed with. The Brotherhood took an action to give an account of funds in his possession.

The case came to trial in December and was adjourned until January 15th. During the argument the counsel for the defence attacked the legality of the organization, claiming it was operating in restraint of trade, and asked that the plaintiffs be non-suited. The judge upheld the claim of the lawyer for the defence and non-suited the plaintiff. He stated that according to the law, the Brotherhood of Locomotive Engineers is an illegal organization operating in restraint of trade and as such cannot come to a court of law to adjust differences between itself and members of the organization. The judgment is said to be the only one of its kind ever delivered on the American continent, and is of far-reaching importance, as it affects all trades union organization. It is altogether probable, however, that it will be carried to the Privy Council.

## NOVA SCOTIA

**MINING THIN COAL SEAMS.**—When the Canadian National Railways lately refused to take any but screened coal from the Cumberland collieries, Springhill excepted, it created consternation among the owners of small mines in the Maccan, River Hibbert and Joggins districts. The Joggins Railway is fed by a number of these small collieries, the seams are usually thin, and the outputs small. They employ, however, a considerable number of men. But now that the slack coal has to be separated it is going to be increasingly difficult to continue to operate all these mines. The market for slack coal is very limited and the price per ton not encouraging. If no means can be devised to use the smaller sizes of coal, it will put these collieries back to the conditions prevailing twelve or fifteen years ago, when many of them were closed. At that time the quality of coal demanded by the market and the price paid were such as to prevent the development of all but the more favored seams of this district. Not until the war had brought larger prices and an indiscriminate use of all kinds and qualities of coal, did some of these little mines become real producers. Having reached this stage, it seems hard that their growth should be arrested by trade conditions, and means are being earnestly sought to use the slack that they may be kept going. The Nova Scotia government is interesting itself, and may be successful in helping to find the solution.

A number of years ago, owing to an inferior quality of coal produced, several of the small mines of this district were seriously affected and some were closed. An interesting experiment was tried by which the refuse material thrown out of the coal was saved and used under a specially built boiler to generate electricity.



A transmission-line was run from this plant to Amherst, a distance of fifteen miles, and the industries of that town operated by electric power. The plant is still in operation and is a success; but it took away part of the market for slack coal, while using up something less valuable. If low-grade material of this kind could be put to such good use, why should slack coal be debarred from our markets? With the present demand for coal we surely cannot be getting back to the days when huge slack piles were built up at different collieries only to be reduced to ashes by spontaneous combustion, if allowed to stay there long enough. This was a tremendous waste of good fuel and no repetition should be permitted.

It is the duty of the government to see that the fuel supply of the county is conserved, that coal is not lost underground by faulty methods of mining, or wasted overground when mined and brought to the surface. It may be that the methods of mining in these small collieries can be improved to reduce the quantity of slack coal made, and thus a better quality of coal sent out. If this were done the problem of mining profitably the thin seams would be easier of solution. It must not be forgotten that thin seams of coal cannot compete in the market on equal terms with thicker ones. While during abnormal times they may have had commercial value, yet in the nature of things most small seams will have to remain unworked until the larger ones are exhausted or until coal prices will permit of their extraction. This is especially true where there are low seams such as those of Cumberland county, lying quite close to larger ones of the best quality.

The Grand Lake District, New Brunswick, has a number of these thin seams, but no thick ones, so far as we know now. But these can all be worked because there are no large seams near by to compete against. Again, the seams lie quite close to the surface and the cost of putting down shafts is not much greater than the sinking of wells for water, in some places. Indeed, when ventilation, which is almost all natural, grown sluggish and the haulage roads get too long, it is found easier and cheaper to sink a new shaft than to continue to use the old road-ways and air-courses.

In Cape Breton the Dominion Coal Company is mining some of the thin seams, especially those that overlie the larger working seams. The Government insists on this to prevent the destruction of these seams by subsidence. But it is no hardship to work a thin with a thick seam, when both are owned and operated by the same company. The case for the thin seams of Cumberland County is not so easy, but in these days of unemployment and scarcity of fuel, nothing should be done to hamper the workmen and to affect adversely the consumer. Let us hope that a solution of the difficulty will soon be found.

### BRITISH COLUMBIA

**CANADA COPPER CONCENTRATE FOR TRAIL.**—The concentrate from the Allenby mill, near Princeton, will be shipped by the Granby Consolidated to the Trail smelter, Consolidated Mining & Smelting Co. of Canada, for treatment. This mill is a part of the plant of the Canada Copper Company which the Granby company is taking over. The suggestion that the output of the Allenby mill should be taken to the Anyox smelter is characterised by H. S. Munroe, General Manager, as impracticable. He states that the Granby company has not assumed control at Copper Mountain but that, as soon as it does the alterations necessary will be made to the equipment and the mill put in shape to handle its

capacity of 2,000 tons a day. Some 400 men would be employed at the new mine and mill.

**GRANBY PROSPECTS IN PORTLAND CANAL DISTRICT.**—In regard to the properties acquired in the Bear River section of Portland Canal, Mr. Munroe states that satisfactory progress is being made with the development of the Sunshine and the George groups. Some diamond drilling is to be done on the latter, which is about 20 miles inland. The Outsider group at Maple Bay is to be equipped with an aerial tramway and other requisite plant and a wharf during the summer. Between 30,000 and 40,000 tons of ore have been blocked out.

**GRANBY'S COPPER SHIPMENTS.**—The Granby company also announces a change in policy as to its shipments from Anyox of blister copper. Hitherto this has gone to Laurel Hill, Long Island. In future it will be sent direct to the Tacoma, Wash., smelter for refining. The Anyox smelter has been a heavy shipper through the port of Vancouver, an average of 1300 tons a month valued at \$450,000 going through that centre. Blister copper has been sent to Vancouver in coasting ships and transferred there to ocean craft bound for New York via the Panama Canal. This has involved payment of port, wharfage, and handling charges at Vancouver, together with insurance and freight to the Atlantic seaboard. Hereafter the ships Grifco, Amur, Anyox, Marmion and the fleet of barges operated by the Coastwise Steamship Co., a subsidiary of the Granby, will carry the concentrate direct to Tacoma.

**PORTLAND CANAL.**—George Clothier, government mining engineer stationed at Prince Rupert, whose district covers the Portland Canal section, is in Victoria on a fortnight's visit. He looks forward to a season of exceptional activity in the North. The Premier, B. C. Silver, Indian, and Big Missouri properties are looking well and numerous prospects are to be developed. Mr. Clothier speaks with enthusiasm of the outlook.

The Prince John group of claims, on the west side of Bear River four miles from Stewart, is reported to have been sold to the New York Exploration Company. In recent development work good milling ore was struck, the values being in copper and gold.

C. A. Banks, managing director of the B. C. Silver Mines, returned to the north a few weeks ago. It is stated that development work is proceeding so satisfactorily that it has been decided to increase the plant and to take on more men. Building materials and machinery have been ordered.

At the annual meeting of the Indian Mines Ltd. held at Prince Rupert, officers were elected as follows: President, Fred Ritchie and secretary treasurer, L. W. Patmore. Among the directors are G. D. B. Turner and George A. Turner. The capitalization has been increased to \$700,000 which, it is estimated, will permit securing plant and the defraying of other initial expenses incidental to bringing the property to the point of production.

**DUTY ON SCRAP PROPOSAL.**—A duty on scrap copper, scrap zinc and scrap brass, all of which now enter Canada free, is urged by the Associated Boards of Trade of Eastern B. C. in a resolution passed at a recent convention held at Trail. The position taken was that scrap metal is competing with the virgin metal produced in Canada and that it should be treated by the tariff on



the same basis as virgin foreign metal. A duty on all base metals entering Canada, up to the point where such metals can be supplied by Canadian producers, also is being recommended.

It is suggested that a delegation from British Columbia should visit Ottawa to advocate the establishment of an Ore Testing Plant in the eastern mining section of British Columbia.

**NEW COAL MINE.** The East Wellington Coal Mines Ltd. has been incorporated to develop coal lands west of the City of Nanaimo and adjacent to the abandoned workings of the "Jingle Pot" Mine. H. W. Maynard is president and J. J. Grant general manager. Good progress already has been made in the driving of the slope. The railway and wharves, together with much of the other plant of the old "Jingle Pot" are to be used. It is expected that production will be started within a month and that an output of 1,000 tons a day will have been reached in six months. It is the Wellington seam that will be exploited. Where it has been struck at a depth of 1100 feet it is five and a half feet thick. The property, it is estimated, will produce 11,000,000 tons.

**NEW COAL MINES REGULATION.**—As a result of recent fatal accidents in the Cassidy Mine of the Granby Consolidated Mining & Smelting Co. and the Wakesiah Mine, Western Fuel Corporation of Canada, regulations under the Coal Mines Regulation Act have been announced by the Hon. Wm. Sloan, Minister of Mines. They provide that "every percussive air drill used for the drilling of holes in coal shall be equipped with a water jet or spray, or other appliance equally efficient, to prevent the escape of coal dust, and of a type approved by the inspector of mines"; that "the use of a compressed air jet for forcibly removing accumulations of gas is strictly prohibited"; that "when accumulation of gas is being removed, the official in charge shall see that no person or persons or lights of any description are allowed on the return side of the gas being removed, unless at a sufficient distance away to allow of a proper diffusion of the gas to a percentage lower than the withdrawal point taking place before it reaches them"; that "the term 'properly fenced', as quoted in General Rule No. 6, shall mean a fence four feet high built of not less than three boards, 1" x 6", spaced so as not to obstruct the ventilation, and nailed securely to posts, or where there are no posts on the ribs, then the ends of the boards shall be hitched into the coal at least three inches and securely wedged"; that "all places fenced off as required under the terms of General Rules and Special Rules shall have securely attached to such a fence in a conspicuous place a danger signal properly worded, with the lettering at least four inches high; the lettering to be stencilled in white on dark background, both to be of durable material that will not easily become obliterated". In one of the accidents referred to the miner lost his life through disregarding a fence and entering a prohibited working. When he was found the boards were scattered and there was some doubt as to whether they had been in place when the workman subsequently overcame by gas, left his partner. In the other case loss of life resulted in the course of removing gas by means of compressed air. The regulations, therefore, are designed to meet effectively these two conditions.

**HIGH WAGES AND COSTLY COKE.**—The Dominion Government is to be asked to probe the whole question of coal mine operating costs and sales prices by the Associated Boards of Trade of Eastern British Columbia. At a Convention of that body, held recently at Trail,

Lorne A. Campbell, of the West Kootenay Power & Light Co., speaking on this subject stated that the wage scale at the mines of the Crow's Nest field was out of balance. The price of coke before the war was \$6.59 while now it was \$12 a ton. Success in the development of natural resources depended upon cheap coal. This was particularly true of low-grade ore bodies. In the Province of Alberta a reduction in the wage scale had been expected last April. The men had struck. While they were willing to accept a reduction, there had been an award in the United States that maintained the scale and the Alberta operators had been compelled to do likewise. The present scale would expire next April and Mr. Campbell suggested that something would have to be done in the meantime as "we must get cheaper coke".

**ALBERTA COAL FOR ONTARIO.**—At a recent meeting of the Edmonton branch of the Canadian Institute of Mining & Metallurgy the problem of supplying the Province of Ontario with coal was discussed and there was general disagreement with the reported statement of the Hon. Charles Stewart, Dominion Minister of Mines, on this subject. Mr. Stewart is reported to have said that with a charge of \$16 a ton for transportation against Alberta coal it was impractical to bring it to Ontario and that the only reasonable solution of the problem was to import United States bituminous coal and coke it in Canada. The Edmonton members said that the freight was \$12.50 a ton under present schedules. From a coal spur near the town of Edson, Alberta, to Prince Rupert, B. C., there was now a rate of \$3.40 a ton. If this mountain rate were applied on a ton-mile base to Toronto the rate would be approximately \$8 instead of \$12.50. That this should be done was the strong opinion of the meeting and representations are to be made accordingly to the Dominion Department of Mines. [Editor's Note — It is now learned that Mr. Stewart was misquoted, and that he stated \$16.00 to be the total cost of Alberta coal in Ontario.]

C. M. Campbell, resident manager of the Cassidy Collieries, Granby Consolidated Mining & Smelting Co., has returned after having spent a holiday in the South. During his absence N. E. Nelson, of the company's staff at Anyox, acted as manager.

### MINES BRANCH POSITIONS OPEN

Applications for two positions of interest to mining engineers will be received up to March 29th by the Civil Service Commission, Ottawa. These are, briefly, as follows:

**5044.**—Assistant chemist, Fuels and Fuel Testing Division, Mines Branch, at an initial salary of \$2,100. The duties are to share in the general activities of this plant, and the candidate is required to be a university graduate in science, or to have had equivalent experience.

**5046.**—Engineer, Ore Dressing and Metallurgical Division, Mines Branch, at an initial salary of \$1,680. The duties are to assist in milling and other tests in the metallurgical laboratories, and university graduation or an equivalent experience is required of the candidate.

The requisite forms of application can be had from the offices of the Employment Service of Canada, from the post-offices in the principal cities, or from the Civil Service Commission, Ottawa.

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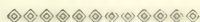
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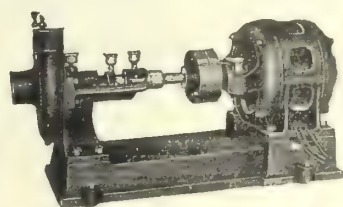
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**MINER'S CERTIFICATES.** First of all, obtain a miner's certificate, from the Department in Quebec or from the nearest agent. The price of this certificate is \$10 and is valid until the first of January following. This certificate gives the right to prospect on public lands and on private lands, on which the mineral rights belong to the Crown.

The holder of the certificate may stake mining claims to the extent of 200 acres.

**WORKING CONDITIONS.** During the first six months following the staking of the claim, work on it must be performed to the extent of at least twenty-five days of eight hours.

**SIX MONTHS AFTER STAKING.** At the expiration of six months from the date of the staking, the prospector, to retain his rights, must take out a mining license.

**MINING LICENSE.** The mining license may cover 40 to 200 acres in unsurveyed territory. The price of this license is Fifty Cents an acre per year, and a fee of \$10.00 on issue. It is valid for one year and is renewable on the same terms, on producing an affidavit that during the year work has been performed to the extent of at least twenty-five days' labour on each forty acres.

**MINING CONCESSION.** Notwithstanding the above, a mining concession may be acquired at any time at the rate of \$5 an acre for SUPERIOR METALS, and \$3 an acre for INFERIOR MINERALS.

The attention of prospectors is especially called to the territory in the North-Western part of the Province of Quebec north of the height of land, where important mineralized belts are known to exist.

**PROVINCIAL LABORATORY.** Special arrangements have been made with POLYTECHNIC SCHOOL of LAVAL UNIVERSITY, 228 ST. DENIS STREET, Montreal, for the determination, assays and analysis of minerals at very reduced rates for the benefit of miners and prospectors in the Province of Quebec. The well equipped laboratories of this institution and its trained chemists ensure results of undoubted integrity and reliability.

The bureau of Mines at Quebec will give all the information desired in connection with the mines and mineral resources of the Province, on application addressed to

**HONORABLE J. E. PERRAULT,**

The Mining Law gives absolute security of Title and is very favourable to the Prospector.

# BRITISH COLUMBIA

## The Mineral Province of Western Canada

Has produced Minerals valued as follows: Placer Gold, \$76,177,403; Lode Gold, \$105,557,977; Silver, \$55,259,485; Lead, \$48,330,575; Copper, \$166,393,488; Zinc, \$21,848,531; Coal and Coke, \$225,409,505; Building Stone, Brick Cement, etc., \$34,072,016; Miscellaneous Minerals, \$1,210,639; Making its mineral production to the end of 1920 show an

**Aggregate Value of \$734,259,619**

The substantial progress of the Mining Industry of this Province is strikingly exhibited in the following figures, which show the value of production for successive five-year periods: For all years to 1895, inclusive \$94,547,241; for five years, 1896-1900, \$57,605,967; for five years, 1901-1905, \$96,509,968; for five years, 1906-1910, \$125,534,474; for five years, 1911-1915, \$142,072,603; for the year 1916, \$42,290,462; for the year 1917, \$37,010,392; for the year 1918, \$41,782,474; for the year 1919, \$33,290,313; 1920, \$35,543,084; 1921, \$28,066,641.

**Production During last ten years, \$336,562,897**

Lode-mining has only been in progress for about twenty-five years, and not 20 per cent. of the Province has been even prospected; 300,000 square miles of unexplored mineral bearing land are open for prospecting.

The Mining Laws of this Province are more liberal and the fees lower than those of any other Province in the Dominion, or any Colony in the British Empire.

Mineral locations are granted to discoverers for nominal fees.

Absolute Titles are obtained by developing such properties, the security of which is guaranteed by Crown Grants.

Full information, together with Mining Reports and Maps may be obtained gratis by addressing.

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**THE HON. THE MINISTER OF MINES**



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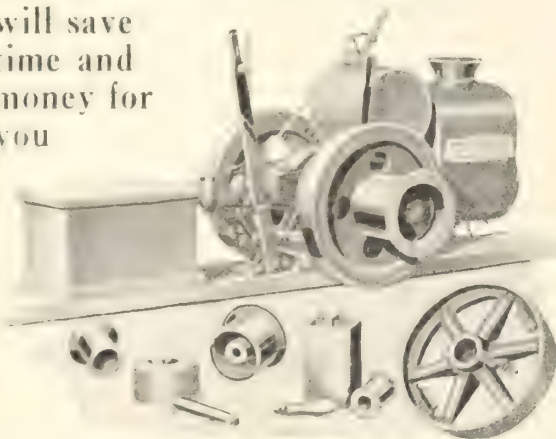
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**Drills, Air and Hammer:**

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Denver Rock Drill Mfg. Co., Ltd.  
Herbert, Alfred, Limited  
Holman Bros. Ltd.  
Sullivan Machinery Co.  
The Mine & Smelter Supply Co.

**Drills—Core:**

Canadian Ingersoll-Rand Co., Ltd.  
Herbert, Alfred, Limited  
Holman Bros., Ltd.  
Sullivan Machinery Co.

**Drill Steel Furnaces:**

Canadian Ingersoll-Rand Co., Ltd.  
Denver Rock Drill Mfg. Co.  
Herbert, Alfred Limited  
Holman Bros., Ltd.  
Sullivan Machinery Co.

**Drills—Diamond:**

Sullivan Machinery Co.

**Drill Steel—Mining:**

Canadian Ingersoll-Rand Co., Ltd.  
Hadfields, Limited  
Mussens, Limited

**Drill Steel Sharpeners:**

Canadian Ingersoll-Rand Co., Ltd.

**Electric Condensers:**

Griswold & Co.  
Canadian Rock Drill Co.  
Denver Rock Drill Mfg. Co., Ltd.  
Herbert, Alfred, Limited  
Holman Bros., Ltd.  
Northern Canada Supply Co.

**Drills—Electric:**

Herbert, Alfred, Limited  
Holman Bros. Ltd.  
Sullivan Machinery Co.  
Northern Electric Co., Ltd.

**Drills—High Speed and Carbon:**

Hadfields, Limited  
Herbert, Alfred, Limited  
Holman Bros. Ltd.

**Ejectors:**

Canadian Ingersoll-Rand Co., Ltd.

**Electric Hoists:**

Canadian Mead-Morrison Co.

**Elevators:**

Canadian Link-Belt Co., Ltd.  
Sullivan Machinery Co.  
Northern Canada Supply Co.  
Hadfields, Limited.  
Jones & Glassco (Regd.).

**Engineering Instruments:**

Laurie & Lamb.  
C. L. Berger & Sons.

**Oil Engines:**

Canadian Ingersoll-Rand Co., Ltd.

**Engines:**

Canadian Sirrocco Co., Ltd.

**Engines—Gas and Gasoline:**

Sullivan Machinery Co.  
Gould, Shapely & Muir Co., Ltd.  
Laurie & Lamb.  
The Mine & Smelter Supply Co.

**Engines—Haulage:**

Canadian Ingersoll-Rand Co., Ltd.

**Engines—Steam:**

Canadian Ingersoll-Rand Co., Ltd.  
Laurie & Lamb.

**Engineers:**

Coyne, Alfred F. A.  
Dresser, John A.  
Door Co.  
Ferrier, W. F.  
Hore, R. E.  
Heves & Sons, Thos.  
Hersey Co., Ltd. Milton  
McEvoy, James C.  
Rogers, George R.  
Ross, Jas. G.  
Stewart, Robert H.  
Tyrrell, J. B.  
Whitman, Alfred B.  
Wilson, Ridgway R.

**Exhauster:**

Canadian Sirrocco Co., Ltd.

**Ferro-Alloys (all Classes):**

Canadian Steel Foundries, Ltd.  
Canadian Steel Foundries, Ltd.  
Everitt & Co.

**Fire Fighting Supplies:**

Gutta Percha & Rubber, Ltd.

**Flood Lamps:**

Northern Electric Co., Ltd.

**Flotation Oil:**

Hercules Powder Co.

**Flourspar:**

Consolidated Mining & Smelting Co.  
Everitt & Co.

**Forging:**

Canada Foundry & Forging, Ltd.

Herbert, Alfred, Limited  
Holman Bros., Ltd.  
Hull Iron & Steel Foundries, Ltd.  
Smart-Turner Machine Co.

**Coal Screening Plants:**

Canadian Link-Belt Co., Ltd.  
Canadian Mead-Morrison Co.

**Cobalt Oxide:**

Everitt & Co.

**Compressors—Air:**

Belliss & Morcom, Ltd.  
Canadian Ingersoll-Rand Co., Ltd.  
Denver Rock Drill Mfg. Co.  
Herbert, Alfred, Limited  
Holman Bros., Ltd.  
Laurie & Lamb.  
Smart-Turner Machine Co.  
Peacock, Brothers, Limited.

**Concrete Mixers:**

Gould, Shapely & Muir Co., Ltd.

**Condensers:**

Canadian Ingersoll-Rand Co. Ltd.  
Smart-Turner Machine Co.  
Belliss & Morcom, Ltd.  
Laurie & Lamb.  
Peacock Brothers, Ltd.

**Concentrating Tables:**

Herbert, Alfred, Limited  
Holman Bros., Ltd.  
The Mine & Smelter Supply Co.

**Condensers—Electrical Static & Power:**

Griswold & Co.

**Consulters and Engineers:**

Milton Hersey Co., Ltd.

**Conveyors:**

Canadian Link-Belt Co., Ltd.  
Canadian Mead-Morrison Co.  
Jones & Glassco (Regd.).

**Conveyor Belts:**

Gutta Percha and Rubber, Ltd.

**Conveyor Flights:**

Canadian Link-Belt Co., Ltd.

**Conveyor—Trough—Belt:**

Canadian Link-Belt Co., Ltd.  
Hendrick Mfg. Co.  
Jones & Glassco, Regd.

**Copper:**

Consolidated Mining & Smelting Co.

**Couplings:**

Hans Renold of Can., Ltd.

**Cranes**

Canadian Link-Belt Co., Ltd.  
Canadian Mead-Morrison Co.  
Peacock Brothers, Limited  
Smart-Turner Machine Co.

**Crane Ropes:**

Allan Whyte & Co.  
Canada Wire & Cable Co.  
Greening, B., Wire Co., Ltd.

**Crucibles:**

The Mine & Smelter Supply Co.

**Crusher Balls:**

Canada Foundries & Forgings, Ltd.  
Herbert, Alfred, Limited  
Holman Bros., Ltd.  
Hull Iron & Steel Foundries, Ltd.  
Peacock Brothers, Limited.  
The William Kennedy & Sons, Ltd.

**Crushers:**

Canadian Ingersoll-Rand Co., Ltd.  
Herbert, Alfred, Limited  
Holman Bros., Ltd.  
Hull Iron & Steel Foundries, Ltd.  
Wettlaufer Bros.  
Lymans, Limited  
The Mine & Smelter Supply Co.  
Hadfields, Limited

**Cut Gears:**

Hans Renold of Can., Ltd.  
Jones & Glassco, Regd.  
The William Kennedy & Sons, Ltd.

**Cyanide:****Cyanide Plant Equipment:**

The Door Co.  
The Mine & Smelter Supply Co.

**Derricks:**

Smart-Turner Machine Co.

**Diamond Drill Contractors:**

Smith & Travers  
Sullivan Machinery Co.

**Digesters:**

Can Chicago Bridge & Iron Co., Ltd.  
Horton Steel Works, Ltd.

**Diesel Engines:**

Belliss & Morcom, Ltd.  
Laurie & Lamb.

**Dies:**

Canada Foundries & Forgings, Ltd.  
Herbert, Alfred, Limited  
Hull Iron & Steel Foundries, Ltd.  
Holman Bros., Ltd.

**Drain Tile:**

Wettlaufer Brothers.

**Dredges:**

Canadian Mead-Morrison Co.

**Dredger Pins:**

Hull Iron & Steel Foundries, Ltd.

**Dredging Machinery:**

Hadfields, Limited  
Hull Iron & Steel Foundries Ltd.

**Cages:**

Canadian Ingersoll-Rand Co. Ltd.  
The Mine & Smelter Supply Co.  
Herbert, Alfred, Limited.  
Holman, Ltd.  
The William Kennedy & Sons, Ltd.

**Cables—Wire:**

Standard Underground Cable Co. Ltd.  
Canada Wire & Cable Co.

**Cable Railway Systems:**

Canada Wire & Cable Co.

**Cam Shafts:**

Canada Foundries & Forgings, Ltd.  
Herbert, Alfred, Limited  
Holman Bros., Ltd.  
Hull Iron & Steel Foundries, Ltd.  
Peacock Brothers, Ltd.  
The William Kennedy & Sons, Ltd.

**Car Dumps:**

Canadian Mead-Morrison Co.  
Herbert, Alfred, Limited.  
Holman Bros., Ltd.  
Sullivan Machinery Co.

**Cars:**

Canadian Mead-Morrison Co.  
Herbert, Alfred, Limited.  
Holman Bros., Ltd.  
John J. Garthshore.  
Peacock Brothers, Limited.  
The William Kennedy & Sons, Ltd.

**Car Pullers:**

Canadian Mead-Morrison Co.

**Car Wheels and Axles:**

Herbert, Alfred, Limited.  
Holman Bros., Ltd.  
Hull Iron & Steel Foundries, Ltd.  
John J. Garthshore.  
Peacock Brothers, Limited  
The William Kennedy & Sons, Ltd.

**Carriers (Gravity):**

Jones & Glassco, Reg.

**Cast Steel Gears:**

Canada Foundries, Ltd.  
The William Kennedy & Sons, Ltd.

**Castings (Iron and Steel):**

Herbert, Alfred, Limited.  
Holman Bros., Ltd.  
Hull Iron & Steel Foundries, Ltd.  
Peacock Brothers, Limited.  
The William Kennedy & Sons, Ltd.

**Cement Machinery:**

Hadfields, Limited.  
Hull Iron & Steel Foundries, Ltd.  
The William Kennedy & Sons, Ltd.

**Chains:**

Jones & Glassco, Reg.  
Canadian Link-Belt Co., Ltd.  
Greening, B., Wire Co., Ltd.

**Chain Drives:**

Jones & Glassco (Regd.)

**Chain Drives—Silent and Steel Roller:**

Canadian Link-Belt Co. Ltd.  
Hans Renold of Can., Ltd.  
Jones & Glassco (Regd.).

**Chemist:**

Thos. Heyes & Sons.  
Milton Hersey Co.  
Ledoux & Co.

**Chrome Ore:**

Everitt & Co.

**Crusher Jaws:**

Canadian Steel Foundries, Ltd.  
The William Kennedy & Sons, Ltd.

**Crushing Rolls:**

Canadian Steel Foundries, Ltd.  
The William Kennedy & Sons, Ltd.

**Classifiers:**

The Dorr Company

**Clutches:**

Canadian Link-Belt Co., Ltd.  
Hans Renold of Can., Ltd.

**Coal:**

Dominion Coal Co.  
Nova Scotia Steel & Coal Co.

**Coal Cutters:**

Sullivan Machinery Co.  
Canadian Ingersoll-Rand Co., Ltd.  
Herbert, Alfred, Limited  
Holman Bros., Ltd.  
Peacock Brothers, Limited

**Coal Crushers:**

Canadian Link-Belt Co., Ltd.  
Peacock Brothers, Limited

**Coal Mining Machinery:**

Canadian Ingersoll-Rand Co., Ltd.  
Canadian Rock Drill Co.  
Denver Rock Drill Mfg. Co., Ltd.  
Sullivan Machinery Co.  
Hadfields, Limited.  
Hendrick Mfg. Co.  
Herbert, Alfred, Limited  
Holman Bros., Ltd.



**Pipes:**

Consolidated Mining &amp; Smelting Co.

Coal and Coke Handling Machinery  
Canadian Link-Belt Co. Ltd.**Coal Pick Machines:**Canadian Ingersoll-Rand Co. Ltd.  
Herbert, Alfred, Limited  
Hull Iron & Steel Foundries, Ltd.  
Sullivan Machinery Co.**Frogs:**Canadian Steel Foundries, Ltd.  
Hull Iron & Steel Foundries.  
John J. Gartshore.**Furnaces—Assay:**Lymans, Limited.  
Mine & Smelter Supply Co.**Gasoline Engines:**Belliss & Morcom, Ltd.  
Laurie & Lamb.**Gasoline Extraction Compressors:**Canadian Ingersoll-Rand Co. Ltd.  
Sullivan Machinery Co.**Gasoline Tanks:**Can. Chicago Bridge & Iron Co., Ltd.  
Horton Steel Works, Ltd.**Gaskets:**

Gutta Percha &amp; Rubber, Ltd.

**Gears:**Hans Renold of Canada, Ltd.  
Jones & Glassco, Regd.  
The William Kennedy & Sons, Ltd.**Gears (Cast):**Canadian Link-Belt Co., Ltd.  
Hull Iron & Steel Foundries, Ltd.  
The William Kennedy & Sons, Ltd.**Gears, Machine Cut:**The Hamilton Gear & Machine Co.  
The William Kennedy & Sons, Ltd.**Gold Refiners:**

Goldsmith Bros.

**Gold Trays:**Can. Chl. Bridge & Iron Works, Ltd.  
Horton Steel Works, Ltd.**Grab-Buckets:**

Canadian Mead-Morrison Co.

**Hand Cars:**

Sylvester Mfg. Co., Ltd.

**Hose:**Goodyear Tire & Rubber Co.  
Gutta Percha & Rubber, Ltd.  
Dunlop Tire & Rubber Co.**Hammer Rock Drills:**Canadian Ingersoll-Rand Co., Ltd.  
Canadian Rock Drill Co.  
Denver Rock Drill Mfg. Co., Ltd.  
Herbert, Alfred, Ltd.  
Sullivan Machinery Co.**Hangers and Cables:**

Stan. Underground Cable Co., Ltd.

**Heating Systems:**

Canadian Sirocco Co., Ltd.

**High Speed Steel:**

Hadfields, Ltd.

**Hoists—Air, Electric and Steam:**Canadian Ingersoll-Rand Co., Ltd.  
Canadian Rock Drill Co.  
Denver Rock Drill Mfg. Co., Ltd.  
Herbert, Alfred, Ltd.  
Holman Bros., Ltd.  
Jones & Glassco, Regd.  
Mine & Smelter Supply Co.  
Canadian Link-Belt Co., Ltd.  
Peacock Bros., Ltd.  
Sullivan Machinery Co.**Hoisting Towers:**

Canadian Mead-Morrison Co.

**Hose:**

Gutta Percha &amp; Rubber, Ltd.

**Hydraulic Machinery:**Hadfields, Ltd.  
Bellis & Morcom, Ltd.  
Laurie & Lamb.  
The William Kennedy & Sons, Ltd.**Oil Storage Tanks:**Can. Chicago Bridge & Iron Co., Ltd.  
Horton Steel Works, Ltd.  
The Toronto Iron Works, Ltd.**Industrial Chemists:**

Hersey, M. &amp; Co., Ltd.

**Insulating Compounds:**

Stan. Underground Cable Co.

**Inspectors:**

Hersey, M. &amp; Co., Ltd.

**Jacks:**

Northern Canada Supply Co.

**Jaw & Gyratory Crushers:**Engineering & Equipment.  
Herbert, Alfred, Limited.  
Holman Bros., Ltd.**Lamp-Miners:**Northern Electric Co.  
Peacock Bros., Ltd.**Lead (Pig):**

Consolidated Mining &amp; Smelting Co.

**Levels:**

C. L. Berger &amp; Sons.

**Light & Heavy Steel Plate Construction:**Hendrick Mfg. Co.  
The William Kennedy & Sons, Ltd.**Locomotives (Steam, Compressed Air and Storage):**Canadian Ingersoll-Rand Co., Ltd.  
Laurie & Lamb.**Link Belt:**Canadian Link-Belt Co., Ltd.  
Northern Canada Supply Co.  
Jones & Glassco, Regd.**Machine Guards:**

Greening, B. Wire Co., Ltd.

**Magnesium Metal:**Everitt & Co.  
Hull Iron & Steel Foundries, Ltd.**Manganese Steel:**Hadfields, Ltd.  
Hull Iron & Steel Foundries, Ltd.**Manganese-Steel Trackworks:**

Canadian Steel Foundries, Ltd.

**Metal Merchants:**Consolidated Mining & Smelting Co.  
C. L. Constant Co.  
Everitt & Co.**Metallurgical Engineers:**

The Dorr Co.

**Metallurgical Machinery:**Dwight & Lloyd Sintering Co.  
The Dorr Co.  
The Mine & Smelter Supply Co.**Metal Work, Heavy Plates:**Can. Chicago Bridge & Iron Co., Ltd.  
Horton Steel Works, Ltd.  
The William Kennedy & Sons, Ltd.**Mica:**

Everitt &amp; Co.

**Mine Cars:**Canadian Steel Foundries, Ltd.  
The William Kennedy & Sons, Ltd.**Mining Engineers:**

Hersey, M. &amp; Co., Ltd.

**Mining Drill Steel:**

Hadfields, Limited.

**Mining Requisites:**Dominion Wire Rope Co., Ltd.  
Hadfields, Limited.  
Hull Iron & Steel Foundries, Ltd.**Mining Ropes:**Dominion Wire Rope Co., Ltd.  
Peacock Brothers, Ltd.**Mine Surveying Instruments:**

C. L. Berger &amp; Sons.

**Molybdenite:**

Everitt &amp; Co.

**Motors:**

Peacock Brothers, Ltd.

**Nickel:**

The Mond Nickel Co., Ltd.

**Ore Handling Equipment:**Canadian Link-Belt Co., Ltd.  
Canadian Mead-Morrison Co.  
Herbert, Alfred, Limited.**Ore Sacks:**

Northern Canada Supply Co.

**Ore Testing Works:**Ledoux & Co.  
Can. Laboratories.  
Hoyt Metal Co.**Ores & Metals—Buyers & Sellers of:**Geo. G. Blackwell.  
Consolidated Mining & Smelting Co.  
Everitt & Co.**Oils:**

Hercules Powder Co.

**Pavers:**Wettlaufers Brothers.  
Gutta Percha & Rubber, Ltd.  
Laurie & Lamb.**Perforated Metals:**Hendrick Mfg. Co.  
Canada Wire & Iron Goods Co.  
Greening, B. Wire Co.**Pillow Blocks:**Canadian Link-Belt Co., Ltd.  
The William Kennedy & Sons, Ltd.**Pipe — Wood Stave:**Pacific Coast Pipe Co.  
Mine & Smelter Supply Co.  
Canadian Ingersoll-Rand Co., Ltd.**Piston Rock Drills:**Mine & Smelter Supply Co.  
Herbert, Alfred, Limited.  
Holman Bros., Ltd.**Plate Works:**Can. Chl. Bridge & Iron Co., Ltd.  
Hendrick Mfg. Co.  
The William Kennedy & Sons, Ltd.  
Horton Steel Works, Ltd.**Platinum Refiners:**

Goldsmith Brothers.

**Pneumatic Tools:**Canadian Ingersoll-Rand Co., Ltd.  
Herbert, Alfred, Limited.  
Holman Bros., Ltd.**Portable Column Hoists:**Canadian Ingersoll-Rand Co., Ltd.  
Denver Rock Drill Mfg. Co.  
Herbert, Alfred, Limited.  
Holman Bros., Ltd.  
Sullivan Machinery Co.**Power Factor Correcting Devices:**

Griswold &amp; Co.

**Power Condensers:**

Griswold &amp; Co.

**Prospecting Mills & Machinery:**

Mine &amp; Smelter Supply Co.

**Pumps—Pneumatic:**Canadian Ingersoll-Rand Co., Ltd.  
Smart-Turner Machine Co.  
Sullivan Machinery Co.**Pumps—Steam:**Canadian Ingersoll-Rand Co., Ltd.  
Northern Canada Supply Co.  
Peacock Brothers, Ltd.  
Smart-Turner Machine Co.**Pumps—Turbines:**Smart-Turner Machine Co.  
Canadian Ingersoll-Rand Co., Ltd.  
Laurie & Lamb.  
Peacock Brothers, Ltd.**Pumps—Vacuum:**Canadian Ingersoll-Rand Co., Ltd.  
Smart-Turner Machine Co.  
Peacock Brothers, Ltd.**Pumps—Valves:**

Peacock Brothers, Ltd.

**Pulleys Shafting and Hangers:**

The William Kennedy &amp; Sons, Ltd.

**Pulverizers—Laboratory:**Herbert, Alfred, Limited.  
Holman Bros., Ltd.  
Mine & Smelter Supply Co.**Pumps—Boiler Feed:**Canadian Ingersoll-Rand Co., Ltd.  
Smart-Turner Machine Co.  
Peacock Brothers, Ltd.**Pumps—Centrifugal:**Canadian Ingersoll-Rand Co., Ltd.  
Laurie & Lamb.  
Peacock Brothers, Limited.  
Smart-Turner Machine Co.**Pumps—Diaphragm:**The Dorr Company.  
The William Kennedy & Sons, Ltd.**Pumps—Electric:**Canadian Ingersoll-Rand Co., Ltd.  
Laurie & Lamb.**Peacock Brothers, Ltd.**

Smart-Turner Machine Co.

**Pumps—Sand & Slime:**Canadian Ingersoll-Rand Co., Ltd.  
Laurie & Lamb.  
Mine & Smelter Supply Co.  
Peacock Brothers, Ltd.  
Smart-Turner Machine Co.  
Sylvester Mfg. Co., Ltd.**Push Cars:**

Sylvester Mfg. Co.

**Poultry Netting:**

Greening, B. Wire Co., Ltd.

**Quarrying Machinery:**Canadian Ingersoll-Rand Co., Ltd.  
Canadian Rock Drill Co.  
Denver Rock Drill Mfg. Co., Ltd.  
Hadfields, Limited.  
Herbert, Alfred, Limited.  
Holman Bros., Ltd.  
Sullivan Machinery Co.

- Balls:**  
Hadfields, Limited.  
John J. Gartshore.
- Refiners:**  
Goldsmith Brothers.
- Riddles:**  
Hendrick Mfg. Co.
- Rod Mills:**  
Mine & Smelter Supply Co.
- Roll Shells:**  
The William Kennedy & Sons, Ltd.  
Canadian Steel Foundries, Ltd.
- Roller Chain:**  
Hans Renold of Canada, Ltd.  
Canadian Link-Belt Co., Ltd.  
Jones & Glassco, Regd.
- Rope—Manilla & Jute:**  
Jones & Glassco, Regd.  
Allan, Whyte & Co.
- Rope—Wire:**  
Anglo Canadian Wire Rope Co.  
Allan, Whyte & Co., Ltd.  
Canada Wire & Cable Co.  
Canada Wire & Iron Goods Co.  
Dominion Wire Rope Co., Ltd.  
Greening, B. Wire Co.
- Rolls—Crushing:**  
Canadian Ingersoll-Rand Co., Ltd.  
Everitt & Co.  
Hadfields, Limited.  
Hull Iron & Steel Foundries, Ltd.  
Herbert, Alfred, Ltd.  
Holman Bros., Ltd.  
Wettlaufer Bros.
- Samplers:**  
Canada Metal Co.  
Ledoux & Co.  
Milton Hersey Co.  
Thos. Heyes & Son.  
Mine & Smelter Supply Co.
- Screens:**  
Canadian Ingersoll-Rand Co., Ltd.  
Greening, B. Wire Co.  
Hendrick Mfg. Co.  
Canada Wire & Iron Goods Co.
- Screens—Cross Patent Flanged Lip:**  
Hendrick Mfg. Co.
- Screens—Perforated Metal:**  
Hendrick Mfg. Co.
- Screens—Shaking:**  
Canadian Link-Belt Co., Ltd.  
Hendrick Mfg. Co.
- Screens—Revolving:**  
Canadian Link-Belt Co., Ltd.  
Hendrick Mfg. Co.  
The William Kennedy & Sons, Ltd.
- Separators:**  
Smart-Turner Machine Co.  
Mine & Smelter Supply Co.
- Sewer Pipes:**  
Wettlaufer Bros.
- Shaft Contractors:**  
Hendrick Mfg. Co.
- Sheet Metal Work:**  
Hendrick Mfg. Co.
- Sheets—Genuine Manganese Bronze:**  
Hendrick Mfg. Co.
- Sheets and Dies:**  
Hull Iron & Steel Foundries, Ltd.  
Peacock Brothers, Ltd.  
The William Kennedy & Sons, Ltd.
- Ship Loaders:**  
Canadian Mead-Morrison Co.
- Silent Chain:**  
Canadian Link-Belt Co., Ltd.  
Hans Renold of Canada, Ltd.  
Jones & Glassco, Regd.
- Silent and Steel Roller:**  
Canadian Link-Belt Co., Ltd.  
Jones & Glassco, Regd.
- Saline Refiners:**  
Goldsmith Brothers.
- Smelters:**  
Goldsmith Bros.
- Sledges:**  
Canada Foundries & Forgings.
- Sintering:**  
Dwight & Lloyd Sintering Co., Inc.
- Smoke Stacks:**  
Can. Chicago Bridge & Iron Co., Ltd.  
Horton Steel Works, Ltd.  
Hendrick Mfg. Co.  
The William Kennedy & Sons, Ltd.
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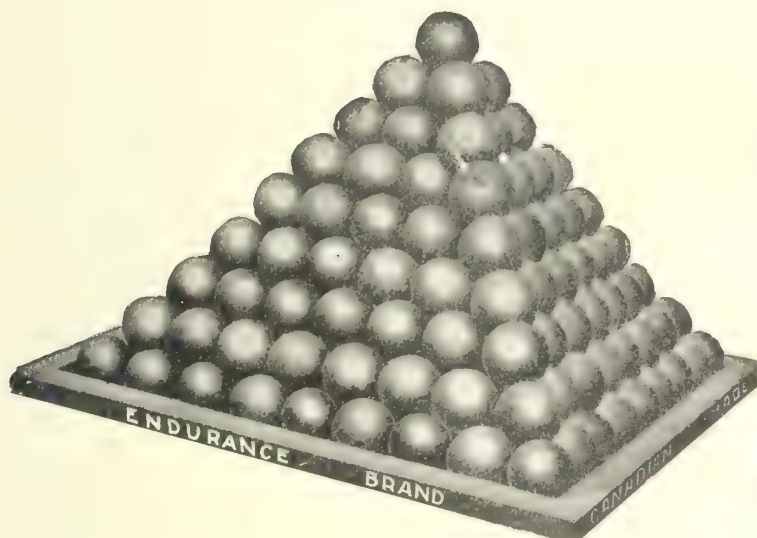
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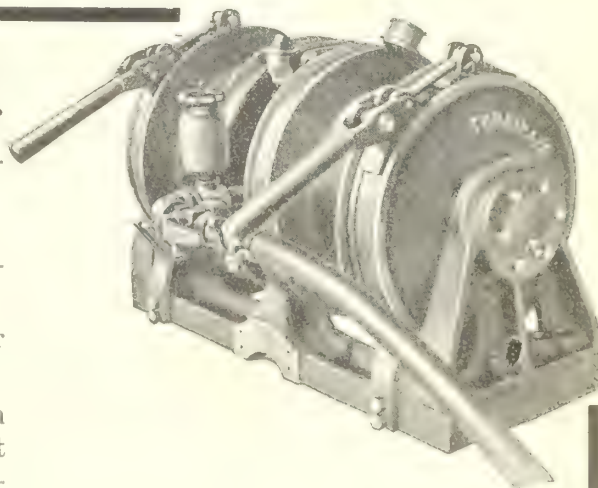
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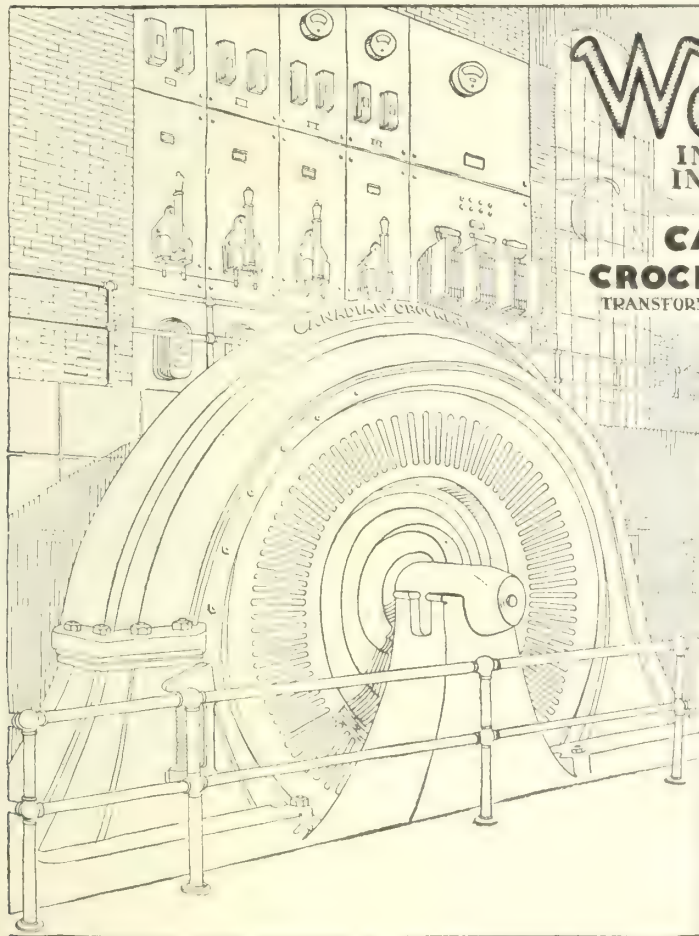
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# Ontario's



# Minerals

PROVINCE OF ONTARIO

DEPARTMENT OF MINES

HON H. MILLS, Minister of Mines

## Mineral Areas.

Ontario, with its 407,262 square miles, contains many millions of acres in which the geological formations are favorable for the occurrence of minerals, 70 per cent of the area being underlain by rocks of pre-Cambrian age. The phenomenally rich silver mines of Cobalt occur in these rocks; so also do the far-famed nickel-copper deposits of Sudbury, the gold of Porcupine and Kirkland Lake, and the iron ore of Magpie and Moose Mountain mines.

## Economic Minerals.

In addition to the above, practically all economic minerals (coal and tin excepted) are found in Ontario:—actinolite, apatite, arsenic, asbestos, cobalt, corundum, feldspar, fluor-spar, graphite, gypsum, iron pyrites, lead, mica, molybdenite, natural gas, palladium, petroleum, platinum, quartz, salt, talc and zinc. This Province has the largest deposits on the continent of talc, feldspar, mica and graphite.

Building materials, such as ornamental marble, limestone, sandstone, granite, trap, sand and gravel, lime, portland cement, brick and tile, meet every demand.

## Mineral Production.

Preliminary returns show the output of the mines and metallurgical works of the Province for the year 1921 to be worth \$48,128,387, of which the metallic production was \$27,574,202.

The following figures show the rapid growth of Ontario's mineral industry by five-year periods since 1891:

| Year.      | Value.      | Year.      | Value.       |
|------------|-------------|------------|--------------|
| 1891 ..... | \$4,705,672 | 1906 ..... | \$22,388,383 |
| 1896 ..... | 5,235,003   | 1911 ..... | 41,976,797   |
| 1901 ..... | 11,831,086  | 1916 ..... | 65,308,822   |

## Dividends.

Dividends and bonuses paid to the end of 1921 amounted to \$23,140,734 for gold mining companies, and \$84,388,185 for silver mining companies or a total of \$107,528,919.

## Mining Regulations.

A miner's license costs \$5.00 per annum, and entitles the holder to stake out in any or every mining division three claims of 40 acres each. After performing 200 days' assessment work on a claim, patent may be obtained from the Crown on payment of \$2.50 or \$3.00 per acre, depending on location in unsurveyed or surveyed territory.

## Assay Office.

The Provincial Assay Office at No. 5 Queen's Park, Toronto, is maintained by the Department of Mines for the free identification of minerals, free assays under the provisions of the Mining Act of Ontario, and also for general assay work as per the Schedule of Charges which may be obtained on application.

## Temiskaming Testing Laboratories

The Department maintains, at Cobalt, an ore sampling and testing laboratory which is now prepared to receive parcels of gold ore from 100 pounds upward, and after sampling and assaying the same to pay to the shipper the value thereof, less treatment charges. The purpose is to afford a market for ores extracted by prospectors and others in developing their mining claims, enabling them to obtain funds which they can use for further work and to report on the most satisfactory method of treatment. Fuller information may be obtained on application to the Manager, Temiskaming Testing Laboratories, Cobalt, Ontario.

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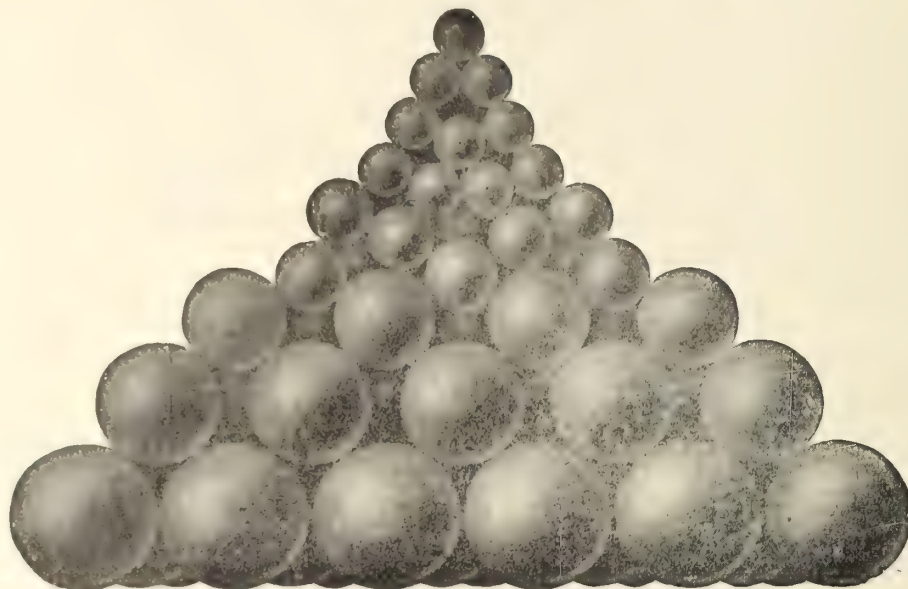
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VOL XLIV

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# EDITORIAL

## CANADIAN COAL FOR CANADA

Nova Scotia coal has been publicly slighted. In his recent annual report to the share-holders as president of the Montreal Light Heat and Power Company, Sir Herbert Holt says: "Owing to the failure of United States sources [of coal supply] by reason of mining and railroad strikes, the major portion of our supply had to be imported from England at abnormal cost and inconvenience as regards handling and utility."

What about Nova Scotia coal for the Montreal gas works? The gas used in Montreal is made normally from imported coal, brought in by rail, and the use of water-borne coal, whether from Nova Scotia or elsewhere, does not come within the calculations of the managers of this concern. Why is this? The obvious deduction from Sir Herbert Holt's statement, without explanation, is that Nova Scotia coal is not suitable for use in a gas works. This is not the case. The fact is that the Montreal gas works is not suitable for the use of Nova Scotia coal.

The coal of Nova Scotia runs from 2 percent upwards in sulphur, as does coal from almost all the world's coal fields. It is unusually low in ash and is a good coking coal. It should be used in the Montreal gas works, but cannot be at present. Sir Herbert Holt naturally would not wish to bring this fact forcibly to the attention of the share-holders of his company; but it should be stated publicly in defence of our own coal. The plant of the Montreal gas works is somewhat antiquated, and was built for the use of coal unusually low in sulphur, obtainable only in selected coal fields in the United States, from certain collieries in Wales, and in a few other districts. The use of Nova Scotia coal in the present plant would result in gas contaminated with sulphur.

The obvious and rational procedure, now that Canadians are alive to the necessity of using their own coal as far as possible, is for the Montreal Light, Heat and Power Company to make such addition and alterations to its gas plant as will permit of the use of coal from Nova Scotia by removing the sulphur from the gas. We do not know whether or not this would be more economical than the use of imported coal; but we do know that it will be principally by means of such action on the part of large consumers of coal that our present huge bill for imported coal will be reduced and Canadian collieries kept working to capacity.

## BRITISH MONEY FOR CANADIAN MINES

A recent visitor to Canada from Scotland, who has been studying Canadian trade conditions for the past six months as an official observer from Glasgow, has contributed an informing and suggestive article to the current number of "Agricultural and Industrial Progress in Canada," an official publication of the Canadian Pacific Railway. His instructions were to investigate:

(a) The increased source of supply for raw materials in British industries and for food stuffs and finished articles.

(b) Scope for the future investment of British capital overseas, and

(c) The development of production, whether of raw materials or manufactured goods.

After dubbing Canada "the Scotland of North America" and pointing out the numerous points of similarity that warrant the comparison, Mr. Cuthbertson concludes: "It appears to me that Canada's most urgent needs at the present time are two in number — men and capital. She is short of these, while it is just these that Scotland has to give. The old land has men of the right sort, and capital for the right kind of undertaking. If, however, Canada desires them she must offer them the right kind of inducement."

This conclusion has a direct application to our mining industry.

It has been stated occasionally that for the capital needed to develop our mineral areas we must turn to the United States, as the war made such a heavy drain upon private fortunes in Great Britain that we can expect little financial aid from that source. Here are words from an official representative of capital in Scotland that give the lie to that conclusion. Scotland has capital "for the right sort of undertaking." Mark these words.

Some months ago we had letters from an investor in Glasgow who had bought shares of Matachewan Gold Mines, which had been distributed quite widely in that part of Scotland. He had tried without success to get information from the headquarters of this company about the progress of its undertaking and its financial status. Now it appears as if this Scot had not been quite canny enough in his investment. He had trusted the good faith of the promoters of Matachewan Gold Mines, apparently without warrant. Canadian gold mining will leave a bad taste in the mouths of this Scottish investor and the friends on



whose behalf he made inquiry to the "Journal". They were unlucky, or indiscreet, in choosing the **wrong** sort of undertaking.

But there is a brighter side to the story. It has been known for some months that a number of the more substantial mining "groups", in London have local representatives in this country, quietly making a thorough examination of the various mining fields. These groups are in no need of advertisement and shun publicity until it is thrust upon them or until their plans have matured. Their representatives have travelled strictly "incog." and have, we expect, searched out a number of the more promising prospects and *bona mines*. A press cable from London announces that the National Mining Corporation and the New Consolidated Gold Fields have collaborated in the formation of a new company, Porcupine Gold Fields Development and Finance Company, for the purpose of investing in the gold fields of Northern Ontario and elsewhere in Canada. These two British companies are closely inter-related, the second being the old Consolidated Gold Fields of South Africa is the new form it assumed in 1919. Both are essentially investment companies, with world-wide interests.

We hope that the forming of this new company marks the commencement of British investment in Canadian mines on a scale that will ensure the control by Britons, here and elsewhere, of the major part of this national resource. The instance we cited above of indiscriminate investment is typical of the means whereby a mining district is given a "black eye." The green-ness of far-away fields will be reduced to the true colour if British investors will make use of the eyes of accredited mining men in London. We welcome the announcement of the new investment company, as an indication that at last British investors, both large and small, will have an opportunity to put their money into genuine mining development in Canada.

### A NARROW ESCAPE

The eastern members of the Canadian Institute of Mining and Metallurgy do not want to restrict the membership in the way proposed by certain western members. This conclusion was unanimous at the meeting in Montreal two weeks ago. As there was no representative present of those that have supported the proposed amendment to the by-laws on membership, there was not even any effective discussion of the question. The only point brought out was that a restricted membership would mean an impaired income — a point that is only on the fringes of the problem.

On this occasion the annual meeting of the Institute came very near to disgracing itself. It was saved, curiously enough, by one of the very members whom our western confrères would have us exclude. A

motion voting down the proposed by-law had been adopted unanimously, and all, from the chairman to the youngest member, were apparently ready to let the matter rest there. It was a non-professional member, better versed in the ways of the business world and of business meetings than are the majority of the Institute's members, who put in a plea for the absent westerners, who have been honest and sincere in their attention to Institute affairs. Once again the meeting attempted to turn the occasion into a joke, and again this non-professional member insisted that the proposal of the western members be treated seriously. Reason prevailed, and the meeting was saved from disgrace.

There is a moral to this tale. We professional miners are rather an all-round lot, with experience in numerous fields of human endeavour. Nevertheless we have not yet corralled the sum-total of human wisdom, nor are we likely to accomplish that laudable end for some time to come. In one direction our education is as yet decidedly incomplete — the direction indicated above. It will be some years before we shall be able to dispense with the aid and advice of men in the great business and financial world outside professional mining. We need the coöperation of these men at this present moment to a greater extent than we realize. The mining industry is the one great national industry whose financial status is still in such a state of primitive chaos that the term "mining investment" provokes a smile from the wise, a grimace from those that have been "stung", a wink from the broker, and a look of interest only from the rare bird who either has won on the gambler's chance or has followed his nose to success.

We need the advice and aid of men in business and financial circles. We shall be wise to secure the active coöperation of those already included in our membership and, as occasion may direct, to enlist the aid of others not yet associated with our fraternity.

### THE NEW KEELEY STOCK

The rapid and sensational rise of the Keeley mine in silver production is a decided source of satisfaction to the mining industry of Canada. Dr. J. Mackintosh Bell has earned the congratulations of his fellow-Canadians both on account of his good judgment in choosing the then discredited Keeley as an investment for his principals in London, and on account of his persistency in pursuing exploration until the soundness of his geological reasoning had been demonstrated. Seldom has the practical application of scientific deduction reaped such a rich reward.

There appears to be a danger, however, that this creditable result of Dr. Bell's labours will be put to a use that will bring discredit in its wake. The Keeley has now some wonderful ore-shoots, found after toil-

some search along a deep-buried contact. It is only in the nature of things that the ore-shoots that have "come in" so rapidly will "pinch out" just as suddenly. There is no doubt that the amazingly rich ore now in sight or immediately in prospect will afford hundreds of thousands of dollars of profit to the owners. Recent events indicate that these owners, not content with the profit they have made and will make from their mine, are preparing to make a further amount from the speculating public by means of the stock market. Only thus can we interpret the recent conjunction of a rich and much-advertised display of ore, the incorporation of a new company on this continent (where there is already a wide market of the speculative variety) and the declaration of an eight percent dividend.

Already too many of our genuine mines have been put to the baser uses of the Canadian mining stock exchanges. These exchanges have an unenviable reputation and are not, and cannot be, patronised by discerning investors. The typical patron of the so-called broker of mining stocks in this country is in virtually the same position as the patron of the race-track book-maker. It is a pity the owners of the Keeley have made a move that will inevitably class them as confrères of the professional book-maker. They had much better decided to keep within the pale as honest miners.

### MINING AND SETTLEMENT

In the voluminous discussion on the immigration "policy" announced recently in the House of Commons, Ottawa, we have as yet found no statement to show that our legislators realize the important part mining development plays in the settlement of the land. We see our government proposing to dole out a little money here and a little money there to aid existing agencies for colonization, but we find no general policy adequate to the need, nor any balanced discussion of the factors that are constantly at work, with or without government subvention, populating the vacant spaces of our land. Among these natural agencies for settlement mining is one of the most important.

How many of the fertile valleys of British Columbia would now be growing their varied crops had not the mining booms proved an irresistible attraction to the pioneers, and the mines thus opened up brought in the railways? The fields and orchards will yield their harvest, long after the mines are worked out; but to the mines belongs the credit of most of the settlement. How much of the fast-filling section of the Great Clay Belt along the Temiskaming and Northern Ontario Railway would now be occupied had not Cobalt, Porcupine and Kirkland brought the thousands of men and their families and provided one of the most lucrative markets for farm produce in Ontario? If gold mines should be established in northwestern Quebec,

settlement in that eastern end of the Great Clay Belt will receive an impetus greater than that provided by ten times the meagre \$600,000 subsidy our Federal government proposes to spend on immigration during the coming twelve-month.

Legislation, or even subsidised immigration, can have comparatively little effect on the settlement of the land compared with the great natural forces that compel migration of the human species. The lure of gold has peopled permanently many parts of the world that would otherwise have waited for a century for settlement. It would have been encouraging to find a recognition of this important fact in the recent discussion in Ottawa—a discussion that matches in barrenness of constructive thought the government's totally inadequate proposals in aid of immigration.

Eleven essays were submitted for the President's prize competition to the Canadian Institute of Mining and Metallurgy this year. The winners were V. S. James and G. H. Salton of Queen's University and C. R. Whittemore of McGill University. Their papers were excellent, as were a number of the others.

### THE DUD

The Gillies Limit rush was on;  
The boys was in the air.  
They talked a lot of bull and con.  
And swung the lead for fair.  
We all had claims for to record,  
But that there darned Recorder  
He kep' us waiting round, my lord!  
To do the thing in order.  
Recorder's office it was shut,  
Sure it was closed till ten,  
When it would open for us — but  
It was uncertain when,  
Or if, we'd get a chance to file:  
The'h was an awful jam;  
The crowd it stretched near half a mile.  
You couldn't wedge or ram  
A bloomin' inch ahead or back.  
Then — sumpin' seemed to break—  
I seen my pardner, Whiskey Jack  
Put out his arm and shake  
A lighted fuse stuck in a stick  
Of healthy dynamite!  
The fuse was sparking good and quick—  
My G--d, it was a fright!  
Says Jack — "Now fade, yeh suckers, fade,  
"I've got the right of way!"  
And say, we sure did make the grade,  
Nobody tried to stay.  
Well, Jack recorded both our claims,  
Then he come sauntering back.  
I asts him why in h-ll he aims  
At pullin' such a crack?  
Well, for a time he shook his head;  
But soon I make him tell:  
That ca'tridge that had scared us dead  
Was filled with sawdust—h-ll!

J. C. M.



# Progress in British Columbia

Gold, Silver, Copper, Lead and Zinc Mines and Smelters Promise Increased Production for 1923

BY ROBERT DUNN

## Copper

With copper hovering round 15 cents the British Columbia copper mining situation has improved. The prospects are that the production of this metal will be largely increased in 1923 in comparison with the previous year.

There are plenty of signs pointing in this direction. One is the activity of the Granby Consolidated Mining & Smelting Co. at Anyox and its action in acquiring the Copper Mountain holdings which, with adequate capital available, should soon be put on a shipping basis. Another is the resumption of operations by the Britannia Mining & Smelting Co. at Howe Sound under conditions that assure a steady flow of material to the new mill and regular shipments of concentrate. A third is the construction of the new Kimberley Mill of the Consolidated Mining & Smelting Co. which, when completed, is expected to lead to the re-opening of the Rossland Mines in a large way. These are the outstanding developments, the progress of which must have an encouraging effect on the many smaller copper and other properties whose owners have been marking time in recent months.

## Silver—Lead—Zinc

But it is not alone the field of copper in which the Province is finding its feet. Could anything be more striking than the strides that are being made by the Consolidated, the pulsating heart of whose industry is found in the mountain-bound smelter town of Trail, perched on the banks of the mighty Columbia river? In the winning of the minerals of the "Big Sullivan" there have been brought to bear the most modern mining methods, applied on such a scale that the ore is pouring into the smelter in hundreds of tons daily. Through the concentrated effort of a group of highly trained and efficient metallurgists the problem of the economic treatment of this decidedly complex lead-zinc ore has been solved with the result that there emerges from the concentrating and smelting plant a production of these two metals that is succeeding in more than holding its own in the world's markets. In quantity the output has been steadily rolling upwards, reaching proportions last year whose industrial significance is as yet little appreciated. As practically all British Columbia's lead and zinc come from Trail, the official provincial statistics for the years 1919, 1920, 1921 and the estimates for 1922 tell the story most effectively. They follow:

|       | 1919       | 1920       | 1921       | 1922        |
|-------|------------|------------|------------|-------------|
|       |            |            |            | (estimated) |
| Lead: | 29,475,968 | 39,331,218 | 41,402,288 | 48,231,000  |
| Zinc: | 56,737,651 | 47,208,268 | 49,419,372 | 59,010,000  |

These figures, of course, give the production in pounds. It is to be noted that, despite occasional adverse market conditions, lead has not failed to show an increase throughout the four year period. The explanation of the slump in zinc in 1920 will occur to all who have been following the markets and it is remarkable that the improvement last year in the market was so quickly made evident in the output. This is not to be attributed so much to outside influences, however, as to the triumph of the metallur-

gical staff of the Consolidated in surmounting difficulties that for so long had seemed insuperable.

## The Kootenays

Whatever may be said in criticism of the policy of the Consolidated in respect of the treatment of custom shippers, there can be no effective denial of the fact that the industry for which it is responsible is the nerve centre of the Kootenay mining camps. Disagreements have occurred in the past. Commissions have examined charges made against the Company. Doubtless misunderstandings will recur. At present it is gratifying to be able to record that good feeling exists between the independent operators and the Company. The hatchet has been buried and the dove of peace has spread her wings over that section of the country. Whatever the future has in store, nothing can detract from the credit due the Company. It has done and continues to do a wonderful work for the mining of the Kootenays of British Columbia and as long as the exigencies of business and the diversified needs of independent operators can be kept harmonious, mining will flourish.

## Portland Canal

Wherever one looks, optimism prevails. In the Portland Canal District the Premier Mine, through recent discoveries, has an assured future. "I have been 31 years in the mining business," stated an elderly engineer just down from the North. "Too many promising properties have sprung up under my eyes, prospered exceedingly for the moment and died away, for me to be easily deluded. I had thought it possible that the Premier Mine was a thing of the day, to peter out and be quickly forgotten. After making a personal examination, granted through the courtesy of the management, my confidence is complete. The Premier is a Mine. Development at depth has proved that beyond dispute. The B. C. Silver, just adjacent, is working in ore of similar character, although the high-grade has not been uncovered." This man speaks for the whole camp. Any doubt that existed has been wiped out, there will be much capital invested in opening up prospects this summer, and the Government, as stated by Hon. T. D. Pattullo, Minister of Lands, when on a visit to Stewart a few weeks ago, will make substantial expenditures in those parts this year. This will go into road and trail construction, one notable undertaking being a permanent bridge across the Bear River, giving access from Hyder and Stewart to the upper Bear River region.

## Cariboo

Cariboo, too, promises to be revived. The Cedar Creek field, with its production of some \$120,000 in a few months by means of the rocker and other primitive expedients, had brought back, in a measure, the old days of the export of bullion in stages and under armed guard. It seems likely that those who took over the original leases, agreeing to pay large sums therefor, will be able to make all their payments in the yield of the ground. Possibly they will reap, in addition, fortunes for themselves. At any rate this



much is certain, that the golden reward of their efforts already is centering attention of prospectors on the possibilities of the Cariboo, that there will be hundreds in the field this Summer, and that hydraulicking, and even dredging, operations will be undertaken on old and new ground on a much greater scale than has been witnessed for years.

Other healthy indications might be quoted. The gratifying reports of developments in connection with the Belmont Surf Inlet Mines Ltd. Princess Royal

Island; the energy displayed in opening up the Drum Lummon Mine, Hartley Bay; the announced determination of the Provincial Department of Mines in co-operation with the Canadian Geological Survey to definitely ascertain by thorough exploration the provincial resources in iron ore; recent discoveries in the Whitewater section of the interior; and the richness of some properties being exploited in the Hudson Bay Mountain zone are among the many incidents pointing to progress.

## THE PROSPECTOR IN WINTER

BY TOM SAVILLE

My love for adventure has lured me into some strange places, but this was the limit. Here I was already on my way North to interview Hudson's Bay Bill, a prospector, who might be any place between Cobalt and Conjuror's House, and in the middle of winter. Our daily paper, "The Planet" was running a series of articles, "The Wood and Woodsman," which had started quite a controversy, the climax of which was reached when an article written by a well known mining engineer appeared stating that he and this prospector had been frozen in away north without an outfit, he having broken his leg and so being unable to travel. He further reported that on account of this prospector's woodcraft they had lived comfortably and well, and outside of being tied up with his broken leg, he had suffered no hardship.

The Chief had said to me, "Ambish, I don't think the people are getting this woods stuff right, and we are largely to blame. We have been publishing articles written mostly by amateurs and the dominant note is hardship, and then more hardship. Now you get right up North and trail this Hudson's Bay Bill and get the story right." So with a letter of credit on any of the Posts of the Hudson's Bay Company and the information that my man was last seen at a little jumping-off place Mus-keg-go-ga-ma on the Canadian National, he starts me off on this expedition—in the middle of January. To tell you the truth, I'm beginning to feel that my story, if I ever get it, will also be one of hardship and grief.

Well, I get to this Mus-keg-go-ga-ma place and everybody seems to be related to Pocohontas. I ask one of them if he has ever heard tell of Hudson's Bay, Bill and in strong Scotch he answers, "Sure. That's him over there at the Post getting ready to pull out with his huskies. I guess he's going back to his camp across the lake. The trail passes here, and as he swings down you'll get a chance to talk to him." As he pulls along side I halt him, introduce myself and tell him why I have come North.

"Come on over to the camp," he tells me, "and talk things over. It's just across the lake."

Pretty soon we come in sight of a well-built log camp facing the south and commanding a good view of the lake. In about two shakes Bill has his huskies tied up, a cheerful fire going, the kettle singing and is cooking some supper. Though he has only spoken a few words, by his actions he has made me feel like a long-lost brother. He has insisted upon my taking my boots off and slipping on a pair of beaded moccasins, and has got me planted in his home-made Morris chair. He tells me, "You'll camp here with me tonight and tell me your troubles."

While Bill is setting the table I sit back and take a few mental pictures of Bill and his camp. Everything

has been scrubbed white, and there are even curtains on the windows, and it is easy to see Bill has the artistic touch, the way he has worked birch bark into articles both for use and ornament. I see a couple of single beds both with red Hudson's Bay blankets and a caribou skin at the foot of each. But what strikes me most is a home-made book-case filled with the old masters, works on Geology and reports of the Departments of Mines. Then I take a look at Bill himself, built like Georges Carpentier, just as clean-cut, and unmistakably a natural-born athlete. In his khaki army breeches and his beaded moccasins he sure is a husky looking fellow.

While some of my pre-conceived ideas of a woodsman are undergoing some change, I hear him call me. "How would you like to join me with some of this Hudson's Bay Mixture?" motioning to his cooking which is already on the table. "Set right in while it's hot. You must be hungry."

While we are both doing justice to it, the newspaper man gets the best of me, and I go fishing for news.

"You've gone to a lot of trouble getting fixed up so comfy. You must expect to be here for some time."

"Yes," he comes back at me. "This is a big country I'm working in and it may take me years to work it out; so I'm making this my headquarters. I find it necessary to come out once in a while for my mail and supplies and this Mus-keg-go-ga-ma is the most convenient place. That's what has brought me out here now. I figured that the Department of Mines would be sending out some reports about this time to us prospectors who are on the mailing list."

"Then you are a prospector?"

"Yes, sir, and proud of it."

"Well, if it's a fair question," I ask, "why so proud of it?"

"Because it's my firm belief that at this particular time, the prospector who is really in love with his work can be of more service to Canada than in any other line of endeavor and at the same time, live a more ideal existence, and he has a good chance of being well rewarded for his efforts."

"But what about hardships, Bill? The prevailing idea outside is that this woods life is one continual round of hardships."

"Well," says Bill, "if you change that word hardships to pleasure, then you've got it right. Why, I'm getting twelve months in the year of what those people who are considered successful and fortunate only get two or three weeks in August—a trip in the woods canoeing and camping."

"Well, Bill, you are the first man I've ever read about or heard talk that way. But tell me, how did you learn to enjoy camping out in the snow, and it



ifty below?" This was a saucy one, but I'll blame that on my newspaper training.)

"I'll tell you," says Bill. "I learnt that from the man who has been camping all over America for ages—the noble Redman."

I could see that this prospector had a good story to tell, but I was in danger of losing it if I continued along these lines; so I decided to come right out in the open and declare myself, man to man.

"Bill," I began, "you have a good story to tell, and I'm going to ask you as one man to another to tell it to me because I'm convinced that it will do a lot of good. As I told you, our paper is at the present time carrying on a campaign, doing the best it can to enlighten the people outside about the actual conditions of frontier life, and your story, I feel, will not only be interesting but also an important contributing factor. So I ask you to open up and give the other fellow the benefit of your woods experience."

"Well," says Bill, "I like to hear a man talk that way; but in telling you the story, I'll have to go away back so you will understand the better how I gained that knowledge of woodcraft that has made life in the woods and prospecting for a living the only life for me. And if by telling this story it should be the means of bringing into the North some of your young men, who, I understand, can be well spared from the cities, to devote themselves to building up the Mining Industry and playing the Big Game, man fashion—well then I'll tell it with pleasure."

"You may wonder why they call me 'Hudson's Bay Bill.' To tell you the truth, as far as I know that's the only name I've got. If I had any other I lost it in France. This is what they told me when I came to in a German hospital—my mind a blank as to who I was or where I came from. Two machines, one a British, the other German, were seen battling away over the lines and had shot each other down. The German, Count Richoff, their ace, was dead and I was next door to it. There was nothing to identify me and the way I felt, I gave them no encouragement."

"I'll jump over the rest of my experience in Germany—it isn't pleasant—and I find myself in London, the war over, and myself in a bad state of mind. I don't know whether I'm a John Bull, Anzac, or Canadian. I can't recollect any thing previous to that crash. While I'm walking the streets of London I see a sign, 'Young men wanted by the Hudson's Bay Company for Service in Canada.' I offer my services and when they ask me my name I have to tell them what has happened. 'Well,' says the manager, who is a kindly sort, 'we'll give you a name—Hudson's Bay Bill—and we'll send you to a Post where you will have a chance to gather yourself together, and maybe, who knows, out there in the silent places it may all come back to you.'

"Sure enough they sent me to a quiet Post away inland, Conjuror's House Post, where I find myself in a new world and amongst the Hudson's Bay Scotch (half breed Indians) whom I soon learn to be real men. The nearest Post to us, Fort Missinabi, is a hundred miles away and they, like ourselves and for that matter most of the Posts of the company, are worlds unto themselves. The fur trade is the Big Business of the company, the winter occupied with hunting and trapping and after the Bear Hunt in the Spring, when all the hunters are in and the furs all well packed, then the 'Voyaging' begins, which means canoeing the furs down to the Bay, where the company's ship from England makes her annual visit,

bringing in supplies and the mails for the different Posts and gathering up a cargo of furs for the return trip.

"This trip down to the Bay is the big event. We usually spend a few days visiting, before starting back up-stream with our winter's supplies.

"I hadn't been long in the fur trade before I began to take an interest in life. My work in the winter was mostly travelling in company with a half-breed Indian named Donald McKenzie, gathering in furs, and in the summertime paddling down and paddling up some pretty rough rivers in company with these half-breeds and Indians with whom it was a treat to travel and to see the way they handled canoes in rough water. I can assure you I had a good chance to learn how to get around both summer and winter.

"Night after night during the winter Donald McKenzie and I would camp outside with only our 'pukwan' (toboggan cover) which we used for our lean to, a rabbit skin blanket and our camp fire; and we'd enjoy ourselves, roll out in the morning, wash in the snow, boil a couple of partridge, some caribou or moose meat and drink the broth instead of tea, pull down our pukwan, throw it over our toboggan and with our outfit laced up tight, maybe each drawing a toboggan, take turns breaking trail in the soft snow. As dogs would be of no use we had left them back at the Post.

"If our rations should happen to run out, we could most always get a bunch of partridge, even without a gun. We would 'shoo' them up into the trees where they would most always perch low; then we would cut a long slender tamarac like a child's fishing pole and with a buckskin string noosed and looped over the end we would slowly reach up and hold the noose in front of his beak, and sure enough he would stick his head into the noose; an upward jerk and it was all the same as fishing. Or if the partridge failed us we would take a fresh rabbit track and we would soon come to where Mr. Rabbit was 'setting.' We always had three ways of getting him into the pot—chase him under a brush pile and then set a couple of small traps for him (which we usually carried in case we ran across fresh fisher tracks, when we would run the fisher into a hole and get him the same way); or we would throw the tomahawk at him (the rabbit), or set a couple of snares ahead on his run-way. When a man has been drawing a toboggan or breaking trail in deep, soft snow and his guts have quit rumbling in disgust, it is surprising what little sporting chance the animals are given to make their get-away.

"But don't think this is hardship; this is the spice of life. I have yet to hear these people tell stories of hardship. There is always some way of getting by. Of course accidents will happen and if it should happen that you can't make a killing, your real woodsman is pretty much like a husky dog—good for a couple of days of fasting, which will most likely take him to some hunter's camp or his own.

"To cut a long story short the worst we have to contend with in the North is the North Wind, and the slush that always comes up on the ice after a heavy fall of snow. But they are both simple when you understand their little ways. The North Wind is the worst of the two; but he has been awfully kind to the movie people; he has supplied them with most of their chilly thrills. His sharp, biting teeth have no terrors for your Hudson's Bay Scotsman. Even though a



'Chinook' were coming over, he would take his teapail, axe, a few matches, and his sash and with his pukwan the North Wind could do his damndest. The Redman or those who have been lucky enough to learn his methods can buck him and get by. We often buck him and get by. We often buck him, but we do it very respectfully, because we know what he can do to us if we give him half a chance. If we are going to buck him, this is the way we do it.

"Maybe you've been setting traps or overhauling them alone. It has been soft all day, your moccasins and mitts are wet and maybe the snow has been sifting down between your pack and your back and the heat of your body has melted it. It is now evening, and that's the time the wind changes or rises, about sunset. You have a lake or two between you and your camp. Sure enough, the clouds that have been dangling low all day begin to lift, and are swinging around to the west and are soon coming from the North. The sky is now clear; the stars come out, and by this time your snowshoe thongs, mitts and moccasins are frozen stiff. You come out of the protection of the woods onto the lake, and that North Wind hits you and makes you feel like you have nothing on but a bathing suit.

"What are you going to do? There are just two things that the woodsman will do, and in either case he goes back into the shelter of the woods or behind the point. He shovels the snow off the side-hill with his snowshoe, pulls off some birch-bark, cuts down a dry stub of a pine or tamarac, makes a good fire, lays down some balsam or spruce brush below his fire to escape the smoke, dries well his mitts and moccasins, his snowshoe thongs and his top shirt or mackinaw. When he has put on everything good and dry, he takes that long woollen sash, winds it first round his head, next turn around his kidneys, and now out and around his waist, and with a little of that hot tea that is now boiled, he'll buck that North Wind and beat him, and will enjoy the satisfaction of knowing that he can beat him.

"Now let's see what happens to the Game Guy (that's when we are the gamest—when we don't know what we are up against). We left him just coming from the shelter of the woods onto the lake. The North Wind hits him and he feels like he's got nothing on him, no more than a bathing suit; his mitts, moccasins and snowshoe thongs are frozen stiff, but he sees a picture of his camp only a couple of miles away. Maybe his pardner is already there, with a fire on and the supper cooked. He is hungry. 'Oh, hell! I can make it,' (he is a game guy), and before he gets half way across he has provided good material for the movies or a first-class story of hardship.

"Now Mr. Newspaper Man I hope you get this idea right about hardship, and see how it can be turned into enjoyment and satisfaction. I can assure you it is some satisfaction to know that when the North challenges you, you can give battle and win."

"What about the summer, Bill?"

"The summer," he answers, "is one grand series of picnics."

"Picnics! For the love of Pete—you're forgetting the black flies and mosquitoes, Bill."

"We have no occasion to remember," he answers, "because the way we handle them they give us no worry. At night we have our little home made canopy, which is also a protection from a light rain, and

in the daytime, travelling or working, we use pine tar and sweet oil, mixed up with a little philosophy, which is surely efficacious. No, neither the mosquitoes nor black flies have any terrors when you've got the right outfit.

"Now, I presume, you want to know how I broke into the mining game. It was in the middle of the summer. We had just got back from 'Moose' (mouth of the Moose River), voyaging a load of supplies, when a Geological Survey party came in from the South. These were the first white people I had met from that side of Canada. They camped at the Post for a few days while they were examining some rock exposures in the vicinity, and young Carlisle told me about this country down here, how the country was getting opened up, and what a great work the prospectors were doing in blazing the way, and what a fine free independent life they led. He spoke also of the opportunities there were to make a Big Strike, which would not only benefit me but the other fellow as well. When I told him later I had decided to go down there, he advised me what books to get on Geology and Mineralogy and what government reports, and in fact got me off to a good start.

"As soon as my period of service was up with the H. B. Co., instead of going back to the Old Country, I came down here, made a trip through the different mining camps, was courteously shown round, had things explained to me and came away from the mining camps with an outfit and a pretty fair working knowledge of where I was going. I chose this part of the country to work in after convincing myself that both the Porcupine and Kirkland Lake gold belts cross this Canadian National Railway to the west.

"This part of the country needs prospectors bad, and there is really a good opportunity for the fellow who will apply himself to work and study. I can see that this prospecting is becoming fashionable as a profession; so when you get back to the city and see any young fellows of the right cast, you might tell them that the land of opportunity is challenging them."

"Well, Bill, after listening to that story of yours, I'll take up that challenge myself, and, I feel I'm going to win. Let's shake!"

## POSITION OPEN IN BRITAIN

The following cable received last week by the Deputy Minister of Mines, Ottawa, shows a first-class opening for a mining engineer proficient in coal mining. Further information can be had on application to the Deputy Minister at Ottawa.

London, March 17th.

"Deputy Minister of Mines, Ottawa.

"Secretary, Mines Department, London, invites applications for post under Safety Mines Research Board. Appointment whole time one, with superannuation. Salary dependent upon qualifications, but not exceeding two thousand pounds per annum. High general scientific qualifications and experience in engineering required, also knowledge of coal mining. Holder of appointment advises Board on research questions relative to safety problems in coal mining and coördinates Board's scientific work. Closing date April Thirtieth. Writing."

"Dominion".



## British Institution of Mining And Metallurgy

Meeting in London Discusses Liquid Oxygen Explosive and the Aneroid Barometer

By ROLAND H. BRIGGS

At a meeting of the Institution of Mining and Metallurgy held in London, England, on February 15th, 1923, papers were read by Mr. Alfred James on "Liquid Oxygen in Mining", and by Mr. R. H. L. Lee on the "Aneroid Barometer and Barograph in Engineering". Mr. James explained that it is now 20 years since the use of liquid oxygen was advocated in mining, and its success during the driving of the Simplon Tunnel caused much favourable comment. The use of the new explosive was greatly increased during the war, owing to the shortage of glycerine. By 1917 the use of liquid oxygen had become general in Germany, by which time there were 72 plants in use at coal mines, varying in production from 5 litres to 110 litres per hour; 56 plants in use at metal (mainly iron ore) mines, ranging from 7 litres to 265 litres per hour capacity; and 32 plants at potash mines. The consumption for explosive purposes in Germany alone was said to have reached during the year 1917, about 23,000,000 litres of liquid oxygen per annum.

### Liquid Oxygen Explosive in Mexico

It is stated that  $1\frac{1}{2}$  litres is as efficient as 1 kilogram of dynamite, though in practice the proportion may be increased to 2 to 1 to allow for evaporation and for the excess of oxygen always desirable in blasting operations. Since the war many users have reverted to the more easily obtainable gelignite, but some large mines still obtain their output by the use of liquid oxygen, notably the de Wendel Mines in Lorraine. The most interesting information at the moment, however, is the remarkable results obtained by Messrs. Calland & Kuryla at the Real del Monte Mines at Pachuca, Mexico, with this method of blasting.

The Rozario mine of this large group has been for the last year maintaining an output of 450 tons per day by the use of liquid oxygen, at an expense of only 65 per cent. of the cost of dynamite at 12 cents per lb. The liquid oxygen is made on the spot by compression and cooling of the atmospheric air, the nitrogen in the liquid air produced being eliminated by differential distillation. The oxygen is drawn off at intervals from a sump into flasks on the thermos principle. Air is first drawn through a tower, through which caustic solution is passed, to separate out the carbon dioxide, after which the air passes into a compressor to bring it to sea level compression.

From the atmospheric compressor the air passes into a 3-stage compressor delivering its output at 3,000 lbs. per square inch. This passes through oil and moisture separators to a nitrogen air cooler, after which more oil and moisture are extracted. The air is then rewarmed, passes through a dryer and next to an ammonia air cooler, whence it passes to an air liquifier. In this apparatus the highly-compressed air passes through long, thin coils surrounded by nitrogen gas, at about -190 deg. C., which has distilled from the liquid air condensing at the bottom of the liquifier. Liquid nitrogen boils at -196 deg. C., liquid oxygen at -184

deg. C. By maintaining the temperature at -190 deg. C., the nitrogen is not liquified, but passes off round the coils, thus cooling them to the temperature required for the liquifaction of the oxygen only. The plant at this mine produces 27 litres of liquid oxygen per hour at a low cost.

### Method of Using Liquid Oxygen

The liquid oxygen is conveyed to the mine in the thermos flasks, and is poured at the actual firing place into vase-shaped containers holding six carbon cartridges. The latter remain immersed for five or ten minutes, and are then inserted in the drilled holes. Electric firing was at first used, but was subsequently replaced by the ordinary fuse and detonators. The blasting is good, the rock being well shattered and the percentage of misfires low. Eighteen or more holes can be fired at one time, the limiting factor being the evaporation of the oxygen. The cartridges are of lamp black in paper containers, and the normal 35 mm. cartridge retains the oxygen in excess for 14 minutes. Sawdust cartridges are only useful for 3 or 4 minutes. The cartridge must absorb more oxygen than the chemical equivalent needed for the reaction, so that carbon dioxide, and not carbon monoxide, is formed. The absence of fumes, easy and quick access after firing, coolness of the atmosphere, innocuousness of "missed" holes after fifteen minutes, all appeal to the miners.

The strength and shattering quality of the explosive may be varied as desired within limits, the blasting is carried out by ordinary miners, and the liquifying plant is run by men without special experience; but the great success of the plant is undoubtedly due to the technical skill available. The results are very satisfactory where cheap power is available, and where imported dynamite is expensive. In "reef" mines there are usually a few holes inaccessible to liquid oxygen containers and for these gelignite is still used.

### European Practice

Contrasted with the Pachuca practice, European methods tend to the replacement of soot cartridges by those containing little carbon. These give greater shattering power and a clearer atmosphere, with little carbonic oxide. Detonators are not used, the notched end of the fuse without a cap being inserted into the cartridge and the fuse fired in the ordinary way. Blasting takes place under water as freely as in dry holes. Cartridges are made of permeable mine dust or grit well rammed in by means of a wooden rammer. The fact that detonators are not used makes European practice less costly and the atmosphere less toxic. The cartridges have a time limit of 30 minutes, the greater period being partly due to the slightly larger diameter, 38 mm. At the great tunnel of the Rove, (Marseilles), the results show liquid oxygen to be 3.6 times cheaper than dynamite for underground work and 4.39 times cheaper in the quarrying work. At Uckange (Moselle) they find that 1.13 litres of liquid oxygen equal 1 kilogram of black powder. At the iron mines of Lorraine, where about 7,000,000 tons of iron ore are produced



yearly by means of liquid oxygen, very high economies are claimed. But it must be remembered that the success of a liquid air installation is mainly dependent on the quality of the technical supervision available.

There is a great reduction of accidents reported in the European mines extensively using liquid oxygen. The output per litre may be judged from the facts that in one group of mines in Lorraine there is an output of 12,000 tons per day for a production of 220 litres and an actual consumption of 150 litres per hour, and at another mine 260 tons are produced for an actual consumption of 2.5 litres per hour. In Mexico, 27 litres per hour suffices for an output of 450 tons per day, and in addition supplies the oxygen necessary for welding and cutting in a large engineering works. The calories generated by the explosion of liquid oxygen are greater than with gelignite of the highest grade, and liquid oxygen is one of the most powerful explosives capable of use in mines.

An installation producing 30 litres per hour requires 30 ft. by 50 ft. of floor-space and about 74 horse-power. A 75-litres per hour plant would require 135 horse-power. Modern installations are much more efficient than the earlier models. The atmosphere in an underground stope after a blast tends to the exhilaration of the worker, rather than the reverse. It is claimed that the presence of liquid oxygen has a similar effect on the mine atmosphere to that of ventilating and refrigerating plants. The use of gaseous oxygen in rescue apparatus for mines is well known.

#### Precision of Aneroid Barometers

Mr. R. H. L. Lee, in the second paper, described the uses of the aneroid barometer in practical engineering. The aneroid is simply a delicate spring balance in equilibrium, which measures differences of atmospheric pressure with a great degree of accuracy. As difference in altitude is not directly proportional to difference in pressure, where the pressure scale of the aneroid is divided into equal divisions the altitude scale is divided into gradually decreasing divisions as the height increases. Or the aneroid dial may have an equally divided altitude scale, with an unequally divided pressure scale. The former type is called an "orometric" aneroid, the latter type an "altimetric" aneroid. In the altimetric aneroid the altitude scale may be fixed or may revolve round the aneroid, so that its zero coincides with the hand, wherever it may be.

The aneroid was invented by a Frenchman in 1843, and the first altitude scales were added by an Englishman in 1851. The limitations of the instrument and complications of atmospheric pressures prevent it from competing with direct measurement, but it has a wide practical scope for rapid determinations of considerable differences of level. No aneroids should be considered which do not carry the certificate of the National Physical Laboratory or equal.

The limits allowed by the National Physical Laboratory for 5-inch diameter aneroids are a maximum scale-error not exceeding 0.04 inch of mercury, or about 40 feet of altitude in a 5,000-foot range instrument, while the average difference between the errors in ascending and descending must not exceed 0.03 inch, or 30 feet. In good aneroids the average maximum error varies between 20 feet and 30 feet. Such errors are very small when measuring comparatively large differences of altitude, but they illustrate the limitations of the aneroid in measuring small differences.

In the case of a 15,000 feet range instrument, the limits allowed are 0.13 inch, or about 130 feet maximum scale error, and an average difference of 0.27 inch, or about 270 feet between rising and falling. Increasing the range to 15,000 feet involves a much greater allowance for error, so that it is inadvisable to purchase such an aneroid for measuring heights less than 5000 feet. The above limits are being improved upon, and altimeters reading to 20,000 feet can be guaranteed within 100 feet error at any point. The tendency is to reduce the National Physical Laboratory tolerances and it is always possible to stipulate for extremely accurate instruments.

The barograph is an instrument that automatically makes a graph of variations in atmospheric pressure against time. In taking altitudes with an aneroid a barograph is a ready means of obtaining automatically a continuous record of atmospheric pressure changes under the best conditions. Good records can be read 0.01 inch, or 10 feet of altitude, which is quite satisfactory for correcting survey records.

#### THE SCHREIBER FIND

The following report of the operations of Messrs. Foster and Glendenning on Schreiber Point appears in this week's "Financial Post.":

Actual tests of ore taken from the new find at Schreiber show values running around \$250. The find in question was made by Messrs. Foster and Glendenning. Assays showed what were termed wild values. Some of them ran into four figures. A test shipment was prepared and sent to the Temiskaming Testing Laboratories at Cobalt. Charles Randall was engaged to conduct tests on the ore. Results have been startling.

Six bags of ore were sent along for the test. Two were estimated to contain \$100 ore and the other three \$250 ore. Mr. Randall pooled the lot and then subjected samples to 36-hour treatment, employing the following methods and getting the following result:

|                               |     |
|-------------------------------|-----|
| Straight Cyanide, roasted ore | 76% |
| Straight Cyanide, raw ore     | 94% |
| Bromo Cyanide, roasted ore    | 95% |
| Bromo Cyanide, raw ore        | 98% |

Ore heads ran \$250.

Then the test was carried on for 50 hours with the following result:

|                               |          |
|-------------------------------|----------|
| Straight Cyanide, roasted ore | 79 %     |
| Straight Cyanide, raw ore     | 98 2/10% |
| Bromo Cyanide, roasted ore    | 97 8/10% |
| Bromo Cyanide, raw ore        | 99 1/10% |

Ore heads ran \$258.60.

These tests are not final. Mr. Randall is continuing his tests. He believes that with fine grinding and long treatment in straight cyanide solution he will be able to get an extraction of 99 1/2 per cent.

To enable further tests to be carried on a 20-ton shipment of the ore is now on its way to Cobalt. This is taken from a large high-grade vein which has been traced from the shore of Lake Superior up the side of a large cliff for some distance and has also been located over the summit of the cliff. But little sinking has been carried out as yet, the work done going down but 15 or 20 feet.

The find in question was the result of prospecting undertaken on the recommendation of one of the Provincial Geologists who had been over the section and encountered the promising geological conditions.



# London and Canadian Mineral Resources

The Keeley Mines, Dr. J. Mackintosh, Bell, and a Complimentary Dinner

By ALEXANDER GRAY

On Monday, 19th, at the Piccadilly Hotel, London, the dinner went round with the viands and with the courtesies turned upon Canada and its mineral resources. The occasion was a complimentary dinner given by Mr. Fred H. Hamilton and the Directors of the Hamilton Bell Company, Limited, to their Canadian Consulting Engineer, Dr. J. Mackintosh Bell, M.I.M.M. Mr. Hamilton B. Wills, President of the Vipond Company and incoming President of the Keeley Company, being included in the toast of the evening. Mr. Hamilton was at his best as toastmaster, was felicitous in his tribute to Lt.-Col. Bell, for his ~~documental services~~ *documental services* in Russia, Australasia, Flanders and Canada, and incidentally complimented Mr. Wills for his exceptionally intimate knowledge of the mines of Canada.

Coming from a gentleman of Mr. Hamilton's erudition — learned as he is in literature, the arts and mining finance, a rare combination — all that was said about Canada and its personalities, and the Keeley Mine in particular, was apt, most cordial and optimistic. No shadow could be thrown "across the pale parabola of joy," between the soup and nuts (quoting the euphonious if abstruse poet) where there was conviviality and enthusiasm directly attributable to developments at the Keeley Mine, of which Dr. Bell had this by way of narrative:

## Pre-Cambrian Potentialities

"He said it was perfectly true that from his earliest acquaintance with Mr. Hamilton he (the speaker) had perceived the possibilities of Canada. Mention had been made of the great mineral wealth that had already been unearthed in those rocks which, following British usage, they had called archæan, but which Mr. Hamilton more correctly called pre-Cambrian. It was a huge triangle stretching from Michigan, to Wisconsin, south of Lake Superior, extending northwards almost to the mouth of the Mackenzie River, an area of country equal almost to half the territory of Canada, which possessed huge mineral possibilities. He did not think he was going too far when he emphasised what Mr. Hamilton had said, that if they looked over the records of mineral advance within the last 30 years, they would find that by far the greater proportion of the mineral discoveries of the world had been made in very small portions of immense tracks of country. Not only did the iron and copper deposits of Michigan occur there, but the deposits of Sudbury, Cobalt, Kirkland Lake and other districts. Wherever the pre-Cambrian rocks occurred mineral was to be found, and it was really extraordinary how widespread were the deposits, which seemed to present great potentialities. It was a delightful thing for them, as Britishers, to realise that they had this within the Empire. Not only were there great possibilities in the unknown country — because it was only a few stretches that had been explored, and those lying near the railways — but even within such areas as Cobalt or Porcupine itself, which were, relatively speaking, well known, there were possibilities which presented great attraction.

## History of the Keeley Mine

"The Keeley was one of those. It was discovered in the autumn of 1907, and the Keeley mine was shortly afterwards bought by a gentleman associated with an organisation known as the Farmers' Bank. The bank advanced large sums of money. The purchase price of the property was \$350,000. An immense amount of machinery was installed, and buildings, etc., erected to develop an extremely rich but, as it turned out, very small deposit on the surface. Within a year and a-half the mine had closed down and the Farmers' Bank, who had been its sponsors, had come to grief. Needless to say, when he got there, a few years later, the camp was as dead as it could be. But there were certain structural reasons which suggested the possibility of those bonanzas they were now encountering, and it was for that reason he took it up. It required a tremendous amount of financial courage, however, to back a purely geological hypothesis — because that was all it was. There was not an ounce of silver showing. Although he appreciated the very kind remarks made by Mr. Hamilton, he could not forget the backing he had always had from him, and from Mr. McCarthy in the technical sense.

"Mr. Hamilton had paid several visits to Canada, and it had been a great inspiration and help to have him there. The day before he (the speaker) left Canada the most remarkable discovery that had ever been made was made—what they called the 'Birth-day Bonanza' was found. He had never seen anything quite so extraordinary in his life—ore averaging 7,390 ozs and 4½ ft. in width. (Applause.) He could not tell them what a great pleasure it was for him to feel that he had been instrumental in some small way in a British company 'making good' in Canada. (Applause.)"

## Appreciation of Dr. Bell's Work

A bumper crop of silver raised upon the ruin of the Keeley property, was a theme to evoke the applause that greeted Dr. Bell. To have a geological hypothesis fructify after so many years into a be-silvered phenomenon, with ore of almost incomparable richness, lent substance, charm and gayety to the festal board, and was ample incentive to form the basis of Mr. Hamilton's remarks, which were more than congratulatory to Dr. Bell. He reviewed his acquaintance with Dr. Bell, from the time he returned from New Zealand, twelve years ago, where he had been Director of the Geological Survey, until the present. During that time he had been associated with a London financial group and recently had brought to their attention the Vipond property, adjoining the Hollinger, and the Keeley in South Lorrain. Of the Keeley Mr. Hamilton said that "even in the palmy days of Cobalt there was no one mine that could show so much high-grade silver ore at any one time as the Keeley could show today." For the Vipond Mr. Hamilton had rosy prognostications to offer.

## Canada a Truly Remarkable Country

Breaking bullion by the ton in the manner outlined by Mr. Hamilton at the Keeley, of which the Wett-



laufer is alleged to have been a mere offshoot, is more concrete than the proposal made in the early days when Mr. Wills was moving the Watts, to "reduce the ore directly to a matte," and thereby simplify metallurgy that bothered Cobalt producers not a little. Mr. Wills, in those days, was an adept novice. He planned revolutionary practice. To-day Mr. Hamilton recognizes him as an outstanding authority on mining affairs throughout the Northland; and the Keeley, the ugly duckling of its discovery period, has all the radiance of the fairest and finest, to be a source of pride and profits, miningwise and marketwise, when the essential details are arranged and production is what is anticipated. Mr. Hamilton and Mr. Hamilton B. Wills know how. Of course, it may not be that the Keeley has as much high-grade silver in sight as any one mine at Cobalt had in its palmy days. South Lorrain has vagaries! But if what the company has is the entrée — if the roast has yet to be served — the meal will be Lucullian and not at all enervating. Mr. Hamilton breathed over the banquet the spirit of the new era when he reinforced Dr. Bell's deduction that "Canada was a remarkable country." Quoting a well-known authority, he reached the conclusion, now known to every Canadian who reads any newspaper, that if the little triangle of pre-Cambrian rocks that juts into the United States south of Lake Superior contains such riches as it does, Canada's vast areas of the same rocks will disclose mineral wealth of which the present mines are the merest sample.

#### Where Canada Leads — London Should Follow

Of special interest at this moment, when the attention of London is sought and when such men as Mr. Hamilton, Dr. Bell and Mr. Curle have spoken, was the brilliant horoscope drawn by Mr. Hamilton with reference to Canadian opportunities. No one is better qualified to fresco facts. South Africa knew him as a forceful personality. He and his colleagues have operated in Australasia, South Africa, Russia and elsewhere. Without abandoning his affection for those fields, but with all the fervor born of South Lorrain values and widths, Mr. Hamilton in his best style put Canada in the picture, when he said:

"He wanted to put it to them that night that London, which was the centre, and had been the centre for a generation, of the mining markets of the world, could not afford to ignore those great developments. He did not think it could ever have afforded it less than to-day, because, owing to the energies of advanced politicians in Russia and elsewhere, a great many large and rich areas of the earth's surface which had been open to British enterprise were now no longer so, and he thought they could only continue to ignore them by allowing that condition of leadership to pass not to Toronto but to New York, for it was remarkable that America had profited more largely than any other country. On national grounds alone, he ventured to say it was undesirable, with this great development which was going on, and which was increasing in importance every year and almost every month, that American capital should over-shadow British capital.

"Personally, he believed that they were on the eve of a very considerable development, and that before many years were over they would see a long list of Canadian Mining stocks dealt in with equal facility in London and in Toronto. (Hear, hear.) There were

technical difficulties in the way, as gentlemen of the Stock Exchange knew, but they were in process of solving them. It might be delayed by 'wild cat' promotions, but that it would come he felt confident, because it was based upon the unassailable foundations of enormous natural wealth which only required systematic exploration and development. (Applause.) He appealed to them, on economic grounds, on national grounds, and on the narrow, but not irrelevant, ground that it was calculated to replenish the deserving institution, the Stock Exchange, and many others — (laughter) — that this movement was deserving of their sympathy and support. He was very glad to feel that it had been powerfully assisted by the achievement of their friend, Dr. Bell, whose health he was now going to ask them to drink. He also coupled with the toast the name of Mr. Wills, the president of the Vipond, and who would shortly become president of the Keeley. He probably knew the mines of the north as well as any man in Canada, and was, he (the chairman) was sure, equally convinced that the co-operation of British and Canadian capital was calculated to be fruitful and beneficial to all concerned." (Applause.)

#### Our Metallurgical Methods Ahead

That Mr. Hamilton has a sootherin' way with him more effective than "that rogue Reilly", will be readily acknowledged. Mr. Wills made the fine point that Northern Ontario has "the largest mining industry in any one Province in the world," which is perfectly true, because the Transvaal is a Colony and mineral production over the border is reckoned by States. It remained for Harry S. Denny, C.B.E., M. I.M.M., erips as a new "tenner", competent in his sphere as a Metallurgical Engineer, captious to the point of caustic criticism when he has the urge, to propose the toast to Chairman Hamilton and to lend the weight of his personal opinion as a Scientist, that Canada has a lot of things worth having. Mr. Denny filmed the results of his recent visit to the North Country. He said his visit to the mines of Porcupine, Kirkland Lake and Cobalt had left him impressed particularly by the metallurgical efficiency attained. He was pleased "to find that in metallurgical methods they had eaten the Witwatersrand . . . The Wright-Hargraves has one of the prettiest plants in Kirkland Lake. . . They were crushing 250 tons of rock per day and they told me that the full complement of men on the plant was two or three. The remarks that have been made about the possibilities of Ontario are, so far as I have been able to observe, very accurate. I came away impressed with the profound conviction that there is an immense future for Ontario."

#### Cigars, Coffee and Dividend

Concluding with the comments of the Agent-General for Ontario, a response by the Chairman, the usual afterthought to the "Press," the cigars and coffee, it devolved upon Dr. Bell, upon his return to Canada, to announce the declaration of an interim dividend on the Keeley shares of 8 per cent. on the \$2,000,000 capital. All the shares having been issued, the amount involved in the distribution is \$160,000. Evidently there was a recent issue of 700,000 treasury shares, which was to be expected in view of the mining and market prospects.



## WESTERN CHEMICAL INDUSTRIES

(Prepared under the Direction of Dr. Charles Camsell, Deputy Minister of Mines by Dr. A. W. G. Wilson, Chief Engineer, Mineral Resources Division.)

The Prairie Provinces of Canada are classed primarily as agricultural areas and up to the present time they have not been considered seriously as probable contributors to the mineral wealth of the country. Recently, however, the resources of these provinces in non-metallie minerals, such as clays, coals, oil, gas, and the sodium and magnesium salts, which occur in the numerous alkali lakes and sloughs throughout the area, have been attracting the attention of capital with the result that considerable activity is evidenced in all these lines.

The increased interest in the alkali deposits of Western Canada has induced the Mines Branch of the Department of Mines, Ottawa, to institute a detailed investigation of these deposits with a view to determining their possible economic value and the extent of resources. The work has now been in progress under the direction of Mr. L. H. Cole during the last two field seasons.

Natural occurrences of soluble mineral salts are known in the provinces of Manitoba, Saskatchewan, Alberta, and British Columbia, either in the form of bedded deposits or as brines. Some are of considerable extent and are probably of sufficient size to warrant commercial exploitation, provided economical methods

of recovery can be developed and sufficient markets can be established.

Three of these deposits are being operated or will shortly be operated in the Prairie Provinces and plans are under way for the development and operation of a fourth deposit.

At Dana, Saskatchewan, a half million dollar plant is nearing completion, to extract salt cake and other chemical products from the brines of Muskiki lake, formerly Houghton lake, 23 miles west of Humboldt, Sask. The company operating this deposit is The Salts and Chemicals, Ltd., controlled by Canadian and United States interests. The main plant of this company is at the deposit at the lake and they have a refining plant at Kitchener, Ontario. When this plant is in operation it is estimated that the output will be 30,000 tons of salt cake per year besides Epsom and other salts recovered as by-products. A small village has been erected at the lake with housing accommodation for 60 men. When the plant is working at fuller capacity 100 men are to be employed.

## Sodium Sulphate Plant

At Frederick lake, five miles southwest of Dunkirk, Sask., and 38 miles from Moose Jaw, Sask., another salt cake recovery plant has been erected by The Bishopie and Lent Co. with head offices at Cincinnati, Ohio. This plant is practically completed with a capacity of fifty tons of salt cake per day, and as soon as it proves commercially successful, further units



(The above cartoon has even greater significance now than when it was first printed in these pages three years ago.)



are to be added to increase the output to 200 tons per day. At the present time, twenty men are employed at this plant.

At a lake five miles north of Fusilier, Saskatchewan, an experimental plan has been operated by a company called Soda Deposits, Ltd., with head office at Calgary, Alberta. This deposit, although somewhat smaller than some of the other deposits, contains sodium sulphate in a very pure state and several shipments have already been made. This company hopes in the near future to be in a position to put its product regularly on the market.

In British Columbia, the Basque Chemical Co. is operating a series of five lakes situated fifteen miles west of Ashcroft, B.C. From these lakes they are excavating crude magnesium sulphate (Epsom salts) which is shipped to Vancouver where it is refined and sold as medical salt and to the tanning industry. Plans are now under way for greatly extending the development of this deposit.

In the vicinity of Meadow lake, fifty miles north of Clinton, B.C., the Lillooet Soda Co. is operating a sodium carbonate lake and shipping their product to Vancouver over the Pacific Great Britain Railway. This material is being disposed of at the present time to the soap manufacturers of the Pacific coast, but plans are under way to dry the material at the lake and increase the output.

#### The Main Products

The several main products which may be expected to be produced from these deposits are Glauber's salt, salt cake, Epsom salts, soda ash, and baking soda.

Sodium sulphate in the anhydrous form, more commonly known by its trade name of salt cake finds its chief use in the manufacture of sulphate pulp, in metallurgical work in the refining of nickel, in the manufacture of window, plate, and bottle glass, and in making water-glass. In the hydrous form, it is marketed as Glauber's salt, and as such is used in tanning, in the textile industry as a mordant, and in medicine.

Hydrous magnesium sulphate or Epsom salts is largely used in the cotton trade for warp-sizing; it is also employed for medicinal and agricultural purposes, and in dyeing with aniline colours, since goods thus treated are found to withstand the action of soap better than those not so treated.

Sodium carbonate in the anhydrous form, known under the trade name of soda ash, is one of the principal forms in which sodium salts are used in the alkali industry, since it frequently forms the base from which other sodium compounds are made. It is used extensively in the manufacture of glass, soap, and dyes, as well as in cleansing preparations, metallurgical processes, and tanning. In the hydrous form it is marketed under the trade name of salt, soda, washing soda or crystal carbonate and as such is used in softening water and to replace soda ash when purity is essential. Sodium bicarbonate or acid sodium carbonate, commonly known as baking soda, is generally marketed in a very pure form, and finds its principal use for making baking powders.

The operations of these companies tend to bring before the public the possibilities of the western provinces in the mineral field and should form the nucleus of the ever increasing industry which in time should prove of great importance to the whole of Canada.—From "Natural Resources."

## MINING OUTLOOK IN THE YUKON

Although in Ottawa, which is in constant touch with the outposts of the Dominion, information is always available, through the North West Territories and Yukon Branch of the Department of the Interior, of that most distant field, Yukon, the presence at the capital on official business of Mr. George P. MacKenzie, the Gold Commissioner, attracts to the territory and its affairs more than usual interest. Mr. Mackenzie is the chief executive officer of the Department of the Interior in the territory and is in touch with all its activities.

### Great Natural Resources

Yukon has great natural resources in her game and fur, and in recent years the agricultural development has been very marked. Fur farming is also becoming an important industry. These, however, are secondary or subsidiary to the metal mining industry which originally attracted the attention of the world to the territory, and which now shows every promise of renewed activity.

Yukon Territory is now a recognized producer of gold, silver, lead, and copper. The total output of the territory to date may conservatively be given as follows: Gold, \$200,000,000; silver, 3,500,000 ounces, valued at \$2,100,000; lead, 3,500 tons, valued at \$400,000; and copper, 12,000,000 pounds, valued at \$2,700,000.

The principal placer field, the area within fifty miles of Dawson, has been intensively operated during the past twenty-five years. The life of the camp during that time may be divided into three phases in so far as the methods employed to recover the gold are concerned: (1) "the primitive," covering the period of wood fires and small open cuts; (2) "the mechanical," when, although the operations were still conducted by individual operators, steam power was used operating certain types of machinery, the greater part of which was evolved in the territory to meet local conditions, and, (3) what may be termed "the corporation" period, which entailed the formation of holdings extensive enough to warrant a very considerable capital expenditure on account of plant, by means of which results could be obtained much more efficiently and much more economically.

While there are quite extensive areas within the Klondike and other districts where ground can still be profitably operated by individual effort, up-to-date mechanical methods being employed, their life as fields of individual endeavour is largely dependent upon the day when the larger plants become available. It may, therefore, be considered that the placer areas immediately surrounding Dawson have passed through the first two phases. A part of this field has also received its final clean-up under the third and last phase of mining activity, but there still remains an area which will keep the available plants, both dredging and hydraulicking, occupied for many years to come. It is not easy to forecast the life and gross results of these operations, but it is safe to say that they will continue for twenty years and should maintain or exceed the present annual output of something over one million dollars per year.

The copper areas of the Territory have not during the past year been active. This is due not only to the copper market but even more to the fact that these deposits have heretofore been operated entirely as "high grades," no capital expenditure which might



put them in the market as standard producers, having been made

### Silver-Lead Ores

Of the total silver output quoted above, over 2,000,000 ounces have been secured as a by-product in the refining of placer gold. During the year 1914-15, some 1,000 tons of silver-lead ores were shipped from the Mayo district. The property supplying this then stopped production and it was not until the discovery of new leads on Keno Hill in the same district that shipments were resumed. During 1921-22, about 5,000 tons of ore were shipped, yielding some 200 ounces per ton in silver and 60 per cent of lead.

During the coming season not less than 7,000 tons of ore of as good or better grade than the above will be produced. Up to the present, by far the greater part of the territorial income has been derived from placer gold operations, and while there is no reason why these should fall below their average of recent years, there is very little doubt that the silver-lead areas will shortly develop the more important industry.

### The Mayo District

The Mayo district now appears to have all the factors that are necessary to the development of a high grade silver camp. Already over 1,500 claims have been taken up, many of which show well defined outcroppings of silver lead ores. Upon three groups a considerable amount of development has been done and two of these are shipping high grade ore with every prospect of increasing their output to the capacity of the transportation systems. At present, the ore is hauled some forty miles, by either horses or gasoline tractors, to the bank of the Stewart river from which it is shipped by river and ocean boat via the mouth of the Yukon river, to Pacific coast smelters. Under present conditions the ore that can be successfully treated is slightly over \$100 per ton. This means that only the higher grades of ore can be handled at present, but the active properties are blocking out much milling ore which it is hoped to either concentrate and ship, or alternatively, reduce in a local smelter.

The camp is already served with good winter roads which can by a moderate expenditure be improved for summer use for all classes of traffic. The camp is easily accessible during summer by steamboat and during winter by stage from Whitehorse. The country affords sufficient lumber for general mining operations and it is also most fortunate in its power potentialities. Fraser falls on the Stewart river, the Canyon on Mayo river, and Janet creek, all quite close to the operating properties, can be developed to produce ample power for all purposes, including the electrical reduction of the ores. It is also feasible to use the power already developed on the Klondike. This could be done by the construction of something less than 100 miles of transmission lines.

The views of the residents of the territory and all those interested in its mineral resources and production are now most optimistic. The life of the placer fields is anything but over, and now it appears certain that a period during which the silver-lead areas of the territory will equal or exceed the gold fields in the production of wealth has just been entered upon, while further gold, silver, and copper deposits may be said to be held in reserve awaiting the day when the world market calls them.—From "Natural Resources."

## LUBRICATION OF GEARS

By CHESTER B. HAMILTON, Jr., M. E.  
President Hamilton Gear and Machine Co.

Durability of gears, given correct design, is dependent largely on lubrication. If an oil film could always be maintained between the teeth they would last indefinitely. This is dependent on two things,— 1 freedom from prolonged overloads which force an abrading metal to metal contact, and, 2. a supply of suitable lubricant to maintain the oil film. The oil must be heavy and sticky enough not to be thrown off nor be squeezed out from between the surfaces. It must be low enough in viscosity to flow freely to the parts needing its service.

### Heavy Oils

For fast running gears which are not enclosed it must be high enough in viscosity to bear the load and to remain on the gear in spite of the effect exerted by centrifugal force. For such applications asphaltum or bitumen base oils are excellent, and also for heavy coarse work such as rolling mill gears. A better lubricant where stickiness is not so essential, and one with almost as high viscosity is a steam refined transmission oil of about 1100 sec. (Saybolt) viscosity. This is the best type of oil for enclosed gear cases. It is better and also cheaper than the 600 steam cylinder oils commonly recommended. In cold weather it may be thinned with a light paraffin machine oil to the desired fluidity.

### Greases

Do not use cup greases of any kind for gears. It does not pay. Like the cylinder oil mentioned above, they are made for specific purposes and should be confined to them. Ball and roller bearings should be packed with petrolatum, vaselene or mineral jelly, which are different names for the same thing.

### Solid Lubricants

Graphite is an excellent solid lubricant. It can best be applied in repeated small doses mixed with the oil. It fills the pores or irregularities of the bearing surfaces and being solid does not squeeze out. Fibre greases should be avoided. Their sole purpose is to act as a cushion to quiet badly worn and noisy gears, and are bad for the bearings. A sufficiently heavy oil would be better.

### Metals

Lead is an excellent solid lubricant if provided in the alloy of worm gear metal. Up to three per cent may be used in bronze worm gears and ten per cent is standard for bronze bushings. For any pair of gears it is best to use different metals or metal of different hardness. This applies especially to soft steel but not to cast iron or to hardened steel which are exceptions to the rule.

### For Rawhide Pinions

It is generally best in this case not to use any lubricant, but if such is desired use only small quantities of a paste made of linseed oil and flake graphite. Avoid all other oils and greases, even those excellent belting oils, neatsfoot and castor oils. Rawhide pinions out of use may be protected from moisture by coating with hot paraffin wax or shellac.

### Gear Cases

For a heavy oil use steam refined transmission oil, but where the case oil is worked through a circulating



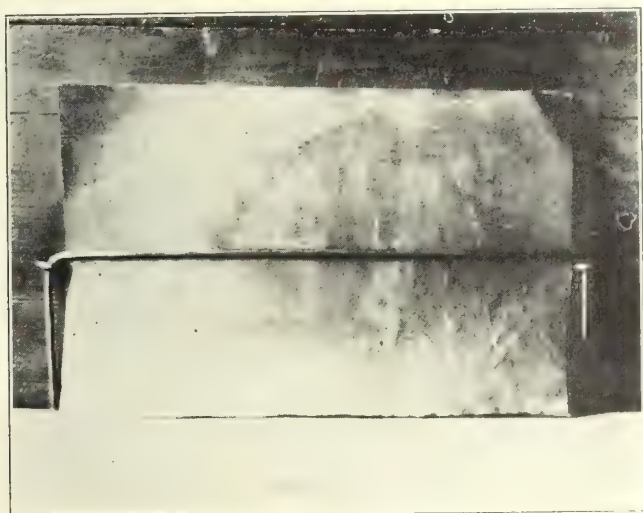
system or fed to ring oiling bearings a lighter oil is needed of about 300 sec. or more viscosity. Use a straight paraffin oil of the viscosity to suit the job. Gear cases should be provided with a drain plug from the lowest point, where sediment would lodge, and also high and low level test plugs, as well as an inspection hand hole.

#### Oil Level

The depth the gears dip into the oil bath is important. The level should never rise above the side of the rim for fast running gears. Worm gears should be arranged with the worm below and provided with a packing gland. Otherwise the maximum level will be governed by the escape of oil through the bearings.

#### AN ADJUSTABLE SHEET METAL HOLDER

Sheet metal can be stored in many ways; in racks vertical or horizontal, on suspended platforms, reared against a wall or just simply laid on the floor. The holder shown in the accompanying photo will, in many instances, be found much handier than others, however, because of its adjustable feature. When material of this kind is likely to remain in an undisturbed condition for some time it might with advantage be laid on the floor in some out-of-way part of the building, but otherwise it is much handier to have it on end and in a position easy to reach.



The adjustable holder shown here is a step in advance of the solid rail behind which sheets of copper, iron, brass etc. are often stored. A solid rail, of course, answers the purpose providing a sufficient number of sheets are stored behind it; but if the number is not sufficient to fill the space between the rail and the wall, the metal sheets work out in one way or another and become a nuisance. The rail shown in the illustration is loose and slides up or down in eye bolts screwed in the wall. Various numbers of sheets can be held snugly against the wall merely by raising or lowering the rail to suit. Bar steel 3-4 inches diameter is the material used for the rail and the eye bolts are large enough to provide for a loose fit.

Recent research into the use of sodium silicate (water glass) as a detergent indicates that it can be used to aid the action of, or even to replace, soap.

The plating of metal articles with chromium to make them stainless has been accomplished by Sheffield metallurgists. It is expected this process will extend still further the use of stainless metal.

#### WAGE DEFLATION IN SOUTH AFRICA

Wages paid to white workers in South Africa at present show a considerable decline from the levels reached in recent years. When a comparison is made between wages on December 31, 1920, and October 1, 1922, it is found that the gold and coal mining industries have made drastic reductions; in fact, in some classifications wages are even below 1915 levels. In the gold-mining industry wages show an average increase of 10 %, as compared with 1914; this increase is considerably below the Government figure for the increased cost of living. Wages of coal miners in the Transvaal have increased 14.6 per cent over 1914, and in Natal, 26.6 per cent. It is apparent from such figures that the purchasing power of the mining communities has been curtailed considerably.

Wages in other industries, although below the 1920 level, show the following increases, as compared with 1914: Engineering trades, 25 per cent; building trades, 30 per cent; governmental transport and communication services, 34 per cent; and the printing trade, 50 per cent. —U. S. Commerce Reports.

At the present rate of production, the silver output of Mexican mines for 1923 will total about 961½ million ounces—a record amount. A large part of the Mexican silver is recovered in conjunction with other metals, and the good markets for the latter has helped the output of silver.

The attention of British investors and manufacturers has been drawn to the excellent chance they have now in Roumania. Germany's former trade ascendancy in that country was in process of renewal after the Armistice; but the discrepancy in the exchanges and the gradual increase in the cost of manufacturing in Germany has made the Roumanian market unprofitable. The French occupation of the Ruhr district has made it still more difficult for Germany to trade in Roumania.

Recent exploration in Ecuador has showed that it will be an important producer of oil. The known petroliferous areas extend along the coast for a distance of 150 miles north of the boundary of Peru.

British Controlled Oilfields, whose head office is in Montreal, have let a contract for 37 miles of steel pipes to connect their oil wells in Venezuela with the coast at Santa Gracia.

An oil concession covering the famous Baku oil fields in Russia has been granted to J. F. Lacey, who represents American investors. Mr. Lacey has stated in an interview in London that he hopes this contract with Soviet Russia will open the door to general trade relations with the world.

Recent discoveries of copper pyrites in Sweden are considered by the Swedish state officers to be adequate for supplying sulphur for the country's pulp mills, as well as to furnish a substantial amount of copper. Evidently it is still economical to use pyrite in Sweden in place of Louisiana sulphur.

A possible new temporary competitor of the South African diamond fields is Russia, where the Soviet government contemplates the confiscation and sale of jewels from the churches.



# The Mining Districts

BY THE JOURNAL'S CORRESPONDENTS

## NORTHERN ONTARIO

**COMET.**—During the month of February Nipissing mined ore of an estimated value of \$179,239 and shipped ore of an estimated value of \$262,058. All silver is taken at 67 cents an ounce. The refinery shipped 60,336 ounces of silver and the cobalt production amounted to 48,163 pounds. The low grade mill treated 6,047 tons and the high grade plant 217 tons. No developments of major importance occurred during the month.

The new shaft of the Colonial property is down over 800 feet, while that of La Rose on the adjoining Violet property is down 400 feet. The Colonial expects to reach the contact within another 100 feet, and a short distance below this point, a cross cut will be started to the vein. The company confidently expects to encounter good ore at this depth.

**ARGONAUT.**—The directors of the Argonaut Gold Mine have called a special meeting of the shareholders to ratify a by-law for the increase in the company's capital from three to four million dollars. The increased stock will not be sold on the open market, but will be used to pay off loans made by the shareholders, in order that when the company starts producing, it may be free of debt; to purchase additional claims adjoining the Argonaut which are in the direction in which the veins of the Argonaut are being worked; and to amalgamate with the Harmonia Mine which the Argonaut holds under lease. The company expects to have its new mill in operation on April 15th and will probably start on a production of about 50 tons a day until the equipment is tuned up.

**KIRKLAND.** A recent report from the Keeley mine states that the remarkable improvement in the property has come about so quickly that the company has been unable to keep pace in the installation of adequate equipment. Changes, however, are now being carried out and early in the summer it is hoped to have the main shaft so enlarged and equipped that it will be possible to hoist 50 per cent. more ore for the mill and also to carry out exploration on several main veins and numerous branch stringers, which up to the present has been impossible. The mill is also being enlarged and a good deal of additional surface construction is being undertaken. The stock is shortly to be listed on the Canadian market, and will probably come out at \$1.75 a share to correspond with the present English price. The company recently paid a dividend of 8 per cent.

**SHORTAGE OF POWER INCREASES.**—The Porcupine gold mines are faced with the third power cut within a month, and are now operating at much less than half their normal output by electric energy. This condition, however, should be eliminated within thirty days, during which time the spring break-up is expected to occur. The new Sturgeon Falls power unit will also be in commission by that time, and it is to be hoped that the development of the district will now be permitted to go ahead without interruption. While production is naturally much lower, the Dome at least has partly overcome this by milling a higher grade of ore. This, of course, is only a temporary condition, but during the

early part of the present month the grade has averaged round \$20 a ton, which is the highest in the history of the company.

The Coniagas has decided to instal a steel head frame, a compressor and a large hoist on the Newray property. It is not known what significance this installation may have, but it is evident that the Company expects to do a considerable amount of underground work.

**KIRKLAND.**—During the month of February the Teck-Hughes treated slightly under 3000 tons of ore and produced \$105,800, or an average of approximately \$35.50 a ton. Sinking operations are being continued to a depth of 1105 feet, which will be the deepest level in the Kirkland district. Drifts from the fourth and fifth levels have been continued into the Orr property, which is now a source of good ore. The Company is making very substantial profits and should soon be in a position to pay off the money which it was necessary to borrow to complete the purchase of the Orr property and also to retire the bonds.

Developments on the lower level of the Wright-Hargreaves indicate one of the best bodies yet found in the Kirkland district. On the 500-foot level a drift has been opened for a length of 700 feet with both faces still in ore and shows an average width of 15 to 17 feet of ore assaying \$11.00 to \$12.00 a ton. This compares with a stopping width in the upper levels of approximately six feet. Work is also being carried on at the 700-foot level where the indications are that a deposit found at 500 feet will be equally important at 700 feet. The shaft is rapidly approaching the 1000-foot level, and as soon as this is completed, drifting will be started at 850 and 1000 feet. Plans are being made for the increase in the mill capacity to 300 tons a day.

The shaft in the Kirkland Lake Proprietary has reached a depth of 690 feet and will be continued to 800 feet. A station is being cut at 675 feet from which development will be undertaken. Alterations are being made to the mill which will permit the treatment of 150 tons a day as soon as the mine development permits.

**GOLD PROPERTIES CHANGE HANDS.**—Several new mining deals in the Kirkland Lake and Porcupine district are reported. In Porcupine, the Scottish Ontario has been taken over by the Canyon Mines Ltd., which is financed by British capital. La Rose has made a contract for 5000 feet of diamond drilling on the Moyer-Bremner property, which it recently acquired under option, and work is to be started immediately. The Whelpdale has been acquired by the Crystal Copper Company of Butte, which is also interested in the Paymaster and adjoining properties. In Kirkland Lake, the Kitchener has been acquired by A. D. Miles of the Anglo-Canadian Exploration Corporation, as has also the Imerson in Larder Lake. Mr. Miles represents the British house, John Taylor & Sons, who are particularly interested in the future of Northern Ontario gold mines, and are very active in acquiring properties.

The gold production of New South Wales, Australia, during 1922 was £107,139, a little more than half that of 1921. Since the discovery of gold there in 1851, £63,000,000 has been won.



## NOVA SCOTIA

**OPEN SHOP FOR SYDNEY STEEL PLANT.**—There was considerable disappointment when President Roy Wolvin visited Sydney some time ago and apparently did or said nothing to help clear up the industrial situation before he left, — except to talk to the Board of Trade. Of course, that in itself was good business, and since then the membership of the Board of Trade has showed a large increase, the new members being very enthusiastic for good trade conditions. Business in Sydney has not responded to the new spirit and there is a feeling that something will happen before long either to clarify the atmosphere or make it worse; so what is known as the waiting attitude has been adopted by most business men of Sydney.

President Wolvin has now, however, declared the policy of the British Empire Steel Corporation, which is as follows:

"The policy of the Dominion Iron & Steel Company, Limited, is to maintain an open shop. We will not discriminate against union men, but will preserve the right to engage any man, union or non-union, who desires to work at the plant.

"The check-off system is wrong in principle, is not in effect at any large steel plants, and will not be accepted by this Company.

"The present orders were taken to increase production and reduce costs and the average prices received, which were competitive, do not cover the cost of manufacture at the present time. However, market conditions indicate that further orders will be obtained at better prices.

"Our first consideration has been to provide employment and we are prepared to consider an increase in wages for our men if we secure orders for the plant that are profitable but until this can be reasonably assured we cannot make a definite announcement."

This policy is in keeping with that followed by all large Steel Corporations in the United States. This does not seem to carry any weight with officers of the Sydney Steel Workers Union, who declare "that they have a right to the check off and an increase of wages". The check-off will never be granted while relations between the workmen and the company are strained to the breaking point through the hostile and aggressive action of the workmen, led on by rash, unbalanced and redblind leaders. The increase hinted at may be put into effect before the storm breaks. Again, the statement made by President Wolvin that the men will share in the profits as these are made goes much farther than the first or even second increase. It states definitely that the interests of the workmen on the Steel Plant are neither to be neglected nor forgotten. There is no doubt that a statement of this kind will go far to mollify the better class of workmen, and if this promise is fulfilled and an increase given, the radical leaders may find it very difficult to bring on a strike at the Sydney plant and carry it to a successful completion.

**STRIKE THREAT INJURES COAL TRADE.**—Mr. A. Dick, General Sales Agent of the Dominion Coal Co., states that the outlook for the coal trade is very good. "By dint of hard and unceasing work, we have won back the St. Lawrence market, and now having it, the problem is to keep it. Our coal is superior to many grades of American coal, both for industrial and for domestic purposes, and in the circumstances our manufacturers and householders will give the Canadian article the preference. But they fear industrial strife, and say with some reason, 'What is the use of engaging with

the Dominion Coal Company to supply us with so much coal per month, when perhaps in the middle of the season, the men may down tools, thereby cutting off our supply?'" This is an argument which appears easy to meet in Cape Breton, but in Montreal and Toronto not quite so easy. All talk of stabilizing the coal trade of Nova Scotia must remain in the background until such time as the strike spectre has been forever laid. Whether or not the Dominion Coal Company can retain the St. Lawrence trade, depends to a large extent on the conduct of the miners of this Province. If the men show a desire to stick to their jobs, then all will be well, but at the least sign of friction between the operators and the United Mine Workers, buyers will shift their purchases to the American side."

Unfortunately there is all too much truth in Mr. Dick's statement, and the good faith necessary to carry through wage agreement has been at times sadly wanting. True, the President of the United Mine Workers openly expressed strong hope for prosperity during the period of the present contract; yet when the recent strike was on statements were made at public meetings that cast doubt on the sincerity of the officers of the United Mine Workers. Whatever these statements may have meant to the outsider purchaser of coal, who, as Mr. Dick says, is easily scared, they meant little to those who know the workmen of the colliery districts. Should a strike occur at Sydney the miners will not lay down their tools and quit. They are quite content at present, and in spite of all that is said about them, they do hold a wage agreement as sacred, or at least enough of them do to split the U. M. W. organization should any attempt be made by their leaders to cause them to violate it.

**INTERNATIONAL BOARD INVESTIGATES.**—After the grilling that the International Board Members have given President Livingstone on the sanctity of wage agreements and the madness of the officers of District 26 in making application to join up with the Red Internationale of Moscow, there is little to be feared from sympathetic strikes. In the language of one of the members of the U. M. W., Mr. Livingstone before the International Board, "was made to look like a monkey. He was turned inside out, and upside down, and showed such feebleness of mind and want of knowledge of the common affairs of industry, that his reputation as a leader is gone". Whatever we may think of labor unions, the members of the International Board of the United Mine Workers have taught the officers of the Nova Scotia District that loyalty to one's country can be best expressed by being loyal to the institutions and industries of the country, and that trade stability and industrial progress should be fostered by all whose interests are directly bound up with them. Another good feature of the international probe as to where District No. 26 is heading, is the publication of the facts in one at least of the local papers in the Glace Bay district. There is nothing like letting the light in, and it is beating with a fierce heat just now, and somehow Moscow does not seem to be quite as attractive as before.

**THE OLD AGE PENSIONS.**—A grand farce was staged before the Halifax legislature last week, with Secretary McLachlan as the leading actor. Some time ago a number of delegates (miners) from Cumberland, Pictou, and Cape Breton Counties, met at Antigonish to consider the matter of old age pensions for miners. Being moderate they agreed that a miner over sixty years of age was entitled to forty dollars per month, and decided to interview the Government at Halifax and present their case. Silby Barrett, International Board Member, was



The head of the delegation, but when he and his friends arrived they found that they had been forestalled by J. B. McLachlan and others. These men had gone one better and instead of asking for the paltry sum of forty dollars per month for the few Nova Scotia miners over sixty years of age, they asked seventy dollars per month for every workmen in Nova Scotia over that age. It was pointed out that it would take twenty million dollars to do this, and when Jimmy was asked where all this money was to come from, he replied, "the industrial income tax". Needless to say, the curtain was rung down and will not be lifted again until this little Province with its four millions of revenue has ~~one~~ <sup>over</sup> its freight. But an International Officer was sidestepped, which was very pleasing to the irrepressible Jimmy. All is not going well between the Reds and the Moderates. The spirit of Robert Baxter is ranging over the District, and nemesis is following fast.

### BRITISH COLUMBIA

**CEDAR CREEK, CARIBOO.**—Gold to the value of about \$145,000 has been recovered from the placer ground of the Cedar Creek Mining Co. up to a few weeks ago, according to F. S. Munson, the general manager. One sluice box is being operated and a second soon will be in use, when production will be doubled. The company is paying for its claims from the yield and expects to have this liability cleared off by April next following which a substantial sum will be invested in development.

It is not long since rockers were displaced by the sluice box on Cedar Creek. Water for the latter consists only of that which drains into the shaft and is forced through a four-inch pipe into the box by a turbine pump. Another of these pumps is being shipped over the snow for use in connection with the second sluice box.

There has been a considerable amount of drifting done and a government official who inspected the field a short time ago says: "I saw a wonderful pay-streak about two feet above bedrock from which nuggets could be picked out with the fingers. One of the miners struck a 'pocket', one shovelful from which contained 13 ounces 5 dwts of gold."

The sluice box in use is about 2 by 68 feet with a run-way of 8-inch riffles. Clean-ups are made about every three days. The greatest return from a single clean-up was 467 ounces and the lowest 36 ounces.

The Cedar Creek diggings are about six miles from Quesnel Dam, Cariboo, and from the present conditions it seems to be assured that there will be a permanent camp at the Dam for at least the next two or three years. This summer it will have about 200 residents with between 500 and 600 men working in the vicinity. The Cedar Creek Mining Co., is erecting a large sawmill near its property.

**PORTLAND CANAL'S RECORD.**—There was a production of over ten million dollars in the northwest districts of British Columbia in the year 1922, representing an increase of more than fifty per cent. over the previous year. So many properties have been brought practically to the production point that the coming season should see exceptional progress.

George Clothier, government mining engineer, bubbles with enthusiasm when discussing prospects in the Salmon, Bear and Nass river sections of the north. Just down from the snow-bound north, he has been

busy telling of the mineral wonder of the Portland Canal, Alice Arm and other regions with which he is officially concerned.

What better record, he asks, could be looked for than that of the Premier Mine with its production in less than two years of \$8,000,000 in gold and silver, its dividends of \$3,150,000 or 63 per cent on its capitalization, and its shipment in 1922 of 70,000 tons of ore containing 120,000 ounces of gold and 4,000,000 ounces of silver? This is a greater production of silver than that of the whole province for any one previous year. Output is regulated by the capacity of the mine's eleven miles aerial tramway, now capable of handling from 200 to 250 tons a day, which may be increased to 300 tons a day. Hitherto ore has been taken from above No. 4 level and diamond drilling has shown that there is good ore below this level. Besides carrying on active development of its first holdings, the company has been acquiring adjacent properties.

More light is thrown by Mr. Clothier on the policy of the Granby Consolidated Mining and Smelting Co. which recently has given evidence of extending its operations by adding to the Anyox smelting plant greater and more reliable power resources, a new concentrator, the acquirement of northern prospects and their development, to say nothing of the taking over of the Copper Mountain Mines and plant. Regarding these embryo mines, viz., the Outsider group, Maple Bay; the Sunshine group, Glacier Creek; and the George group, Bear River; it is stated that the former will be shipping to Anyox early this year and that both the latter are giving promise of becoming important copper ore producers. If the George group proves up to expectations it will mean the extension of the Bear River railway, and the consequent opening of the Nass River mineralized zone. Mr. Clothier says that the department of mines has built about twenty-five miles of miners' trails on the Nass side of the mountains and he considers the possibility of railway connection a matter of importance from a mining viewpoint. It is clear at any rate that the Granby Company proposes that its future supply of smelter feed shall be assured.

Other properties mentioned by Mr. Clothier are the B. C. Silver Mines Ltd., near the Premier, in regard to which he confirms reports of the encouraging showings recently uncovered; the Indian Mines Ltd., which has proved a large body of milling ore; and the Big Missouri, abandoned by Sir Donald Mann as a result of adverse reports, subsequently bonded by Messrs. Trites and Wood, of Fernie, large holders in the Premier, and which on late development seems to be disproving pessimistic statements as to its value, the sinking of a shaft having shown high-grade ore at a considerable depth.

It is admitted that the Dolly Varden mine's unfortunate decline has been a set-back to Alice Arm; but Mr. Clothier does not think the last has been heard of this district. He expects to see the Engineer mine, Atlin, become one of the large lode gold producers of the Province. For years litigation has had this property in its grip. These difficulties now have been cleared away and action should follow.

He said, too, that there were important placer mining developments on McAdam, Dease and Thibert Creeks and that the possibilities of the Dease Lake country, in this respect, would stand full investigation.

**PORTLAND CANAL PROSPECTS.**—No further evidence of mining activity in the Portland Canal Mining Divi-



sion is necessary than the number and variety of properties reported to be changing hands, to be under development, or to be about to receive attention. Here are some of them.

Gustave Seiffert, with a bond on the Rufus group of seven claims 18 miles from Stewart on the north side of Bear river, is said to have returned north with enough financial support to carry on development. Several outcrops of high-grade ore are reported to have been located, samples from which run as high as 444 oz. in silver. The prospect is at an elevation of 2400 feet and two and a half miles of trail will have to be constructed to make it accessible.

The Gloria group of twelve claims, Bulldog creek, between Marmot and Georgia creeks, will be explored by a company organized in Seattle. The terms provide that the company is to spend \$70,000 on development, less 20 per cent. for promotion. A. Lineke, of Hyder, the owner, will be manager of the work.

The B. C. Silver Mines Ltd. have opened their own assay office at the mine with J. C. Comrie, who was similarly employed at the Dolly Varden mine, in charge.

Development is proceeding on the Prince John group and is expected to have advanced sufficient in a few months to warrant installation of more plant. This property is in the Bear river district.

A considerable quantity of good milling ore is reported to have been opened up on the Titan group, Fish creek.

**INCREASED TAXATION OF CLAIMS?—**Whether the provincial government would be justified, through increased taxation, in compelling continuous development of crown granted mineral claims is a question upon which there is decided difference of opinion. Some weeks ago an organization at Silvertown, a mining town of the Slocan, passed a resolution deploring the number of unworked claims held idle by their owners. The contention was that the tax of 25 cents an acre on crown granted mineral claims was much too low, that it had the effect of countenancing the holding of such claims speculatively, and that men desirous of doing actual development were being discouraged by the condition. The Vancouver Island Prospectors' Association, however, declares that crown granted mineral lands are taxed as heavily as is warranted, that an increase would mean the reversion to the Crown of many which now are revenue-producing, and points out that already 2,500 such claims have come back to the Government, winding up by asserting that no effort should be made to insist on continuous development of mineral lands until the Administration is prepared to "compel the continuous operation of coal, pulp, timber and agricultural areas held under Crown grants."

**PREMIER ACQUIRES MORE CLAIMS.—**The Mineral Basin group of claims, near the Premier Mine, Salmon River, is reported to have been acquired by interests associated with the Premier Gold Mining Co. This group adjoins the Northern Light claims, which are controlled by the B. C. Silver Mines, Ltd. Its surface showings are not particularly attractive but the property lies on the main strike of the known ore-bodies and for this reason, no doubt, has been taken over for the Premier.

**ALICE ARM.—**The Homestake Mining Co., whose holdings are on the headwaters of the Kitsault River, Alice Arm district, plans resumption of development this summer. The last work done here was in the summer of 1921 when it was reported that a body of

ore had been broken into containing good values in gold, silver, and copper.

**ORE FROM KENO HILL.—**Reports from Dawson Y. T. are to the effect that, as a result of the winter's work at Mayo, there will be 8,000 tons of ore at Mayo Landing for shipment when navigation opens. The caterpillar truck is said to have proved a pronounced success. Weather conditions, however, severe, have not interfered with their efficiency.

**B. C. ORE EXHIBITS FOR LONDON.—**Inquiries received from England at the B. C. Department of Mines indicate that keen interest is being manifested at present in the mining industry of British Columbia. Information is sought particularly of developments in the Portland Canal district, although the attention of prospective Old Country investors is not confined to that region.

As a result of this situation the Hon. Wm. Sloan, Minister of Mines, has had a collection of the ores of the Salmon River area prepared and shipped for display at the offices of the Agent General for British Columbia, London. Included in the exhibit are some fine specimens of the rich gold-silver bearing ores of the Premier Mine. Mr. F. C. Wade, the Agent General, will give the collection a prominent place in British Columbia House.

The Department, Mr. Sloan states, also is assembling a representative exhibit of the ores of the different mineral producing districts of the Province for the great Empire Exposition to be held in England next year. To get together samples from all sections that will adequately illustrate the mineral resources of the Province is not a task easily accomplished. The work has been in progress for some months and when the display is complete it probably will be the finest of its kind that has ever left British Columbia. Exceptional care is being exercised in the preparation of this collection because of the importance of the Empire Exposition as a medium of international publicity.

**INCREASED COMPENSATION TAX IN ALBERTA.—**The coal mine operators of the Province of Alberta are protesting against a proposed increase of compensation rate under the Alberta Workmen's Compensation Act of from 55 to 66  $\frac{2}{3}$  per cent. but there is no indication that Premier Greenfield's government is prepared to make any concessions.

Representatives of the collieries admit that the change would put Alberta's rate on the same plane at that of other provinces but they claim that comparisons are not fair because of the high wages paid in Alberta. True 66  $\frac{2}{3}$  is the basis in Ontario, but there metalliferous miners receive \$4.50 a day while in Alberta mines the wages are \$7.50 a day and upwards. An independent body of men in the first instance, it was stated, had fixed upon \$10 a week as sufficient for compensation, but there had since been a steady advance as a result of pressure by labor organizations on the government.

Premier Greenfield has retorted that such an assertion is not correct, that if labor's demands had been acceded to, increases under the Workmen's Compensation Act would have amounted to thousands of dollars annually, and that the increases proposed would not total more than \$10,000 from the mining industry, or one-sixth of a cent per ton on the coal mined in the province.

This, it was said, had no bearing on the principle involved and that while miners wages were maintained



on a war-time basis there was no reason for increasing compensation.

**FEBRUARY COAL OUTPUT.**—The coal output of British Columbia for the month of February totalled 244,042 tons, comprising 128,389 tons from Vancouver Island collieries, 26,449 from the Nicola-Princeton district and 89,204 from the Crow's Nest Pass.

**MR. WARREN'S ADDRESS.**—J. J. Warren, president of the Consolidated Mining and Smelting Co. of Canada, gave an interesting address recently to the Associated Board of Trade of Eastern B. C. on the mining situation, one of the most important statements made being that Rossland, one of the historic camps of the Province which for some years has been practically dormant, may be expected to become active in a short time.

As to the mining industry, he stated, "We have had prices that are too high. The reason I say this is that these high prices result in the working of some properties that should not be worked, and that can only be worked while prices are high. We would be far better off with lower prices and more stable conditions. The main trouble with high prices is that there is always a reaction."

"No doubt there is a boom on in the United States. There seems to be there the same feverish condition as existed during the war. For instance, I sometimes take the auto industry as a barometer, and on the other side they cannot supply the demand for autos. Of course there is a resultant call for metals. Yet autos do not make a country prosperous; in fact they take a large number of men away from other and more useful production. And there is a limit to the number of autos a country can afford. We must not be carried away by such feverish conditions."

"Four or five months is about as far ahead as we can look in the metal line just now. We seem to be all right; I hope that we shall be all right, for Trail would really be about the last place that would be shut down."

Discussing the standing of the company, Mr. Warren stated that at the present time more power was a necessity and in that connection he stated "we are lucky to have Mr. Campbell (Lorne A.) who has done so well in power development, and it won't be my fault if he doesn't develop some more."

Conditions, stated Mr. Warren, were not bad; in fact they were fairly good. That was as it should be, and he disliked to see people getting excited because things were going well. Referring to the U. S. tariff, he declared that one would rather think that there ought to be a limit to which a tariff could rise. If a country was to be developed local conditions rather than foreign conditions should largely control prices. Only 50 per cent. of the metal produced at the Trail smelter was consumed in Canada. In fact the company had sent some to Germany and had been paid for it, and had not taken German marks either!

"Our policy is to increase domestic consumption," declared the speaker. "We make special prices to Canadian manufacturers to enable them to export their manufactures. Consequently many of these are increasing production, and this means more prosperity for Canada. When we have to send over 50 per cent. of our products to the ends of the earth and compete there with all comers you will understand that we do not receive the prices generally quoted in the press. We are not at all alarmed about the future, but I expect we are bound to have some reaction within the next six months."

Mr. Warren announced that he had recently visited

the Sullivan mine with the general manager, S. G. Blaylock, and could say that the new mill there would be running shortly.

"We expended \$300,000 in 1922 to carry on in Rossland," asserted Mr. Warren, "and in view of that I do not think that we deserve any criticism. Our policy was to keep going until the Sullivan mill was ready, but when we found that the price of coke was not to be reduced, it would have been folly to continue. We feel, however, that much is in store for Rossland and that by this time next year it will be going strong."

S. G. Blaylock, general manager of the company, also addressed the convention, remarking that when the delegates visited the plant and saw the copper plant standing idle they would be glad that they had passed resolutions aimed to aid the copper industry.



#### PURCHASE OF GOLD ORES

The attention of prospectors and others is drawn to the provision in the Mining Act of Ontario authorizing the Department of Mines to purchase parcels of gold ore taken out by prospectors and others in developing or working mining claims. Arrangements have been made by which such parcels of gold ore, whether large or small, will be accepted by the Timiskaming Testing Laboratories at Cobalt, and paid for according to the schedule provided for the purpose. The Laboratories are operated under the auspices of the Department of Mines.

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**THOS. W. GIBSON,**  
Deputy Minister of Mines.

Toronto, 12th March, 1923.

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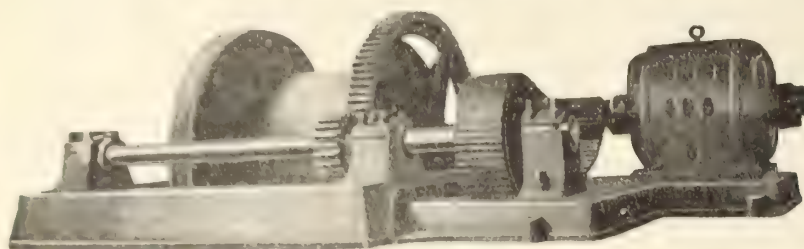
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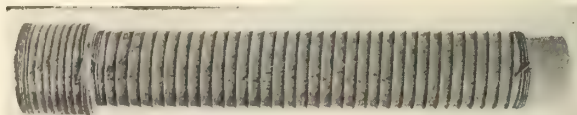
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The William Kennedy & Sons, Ltd.**Cables—Wire:**Standard Underground Cable Co. Ltd.  
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Canada Wire &amp; Cable Co.

**Cam Shafts:**Canada Foundries & Forgings, Ltd.  
Hebert, Alfred, Limited  
Holman Bros., Ltd.  
Hull Iron & Steel Foundries, Ltd.  
Peacock Brothers, Ltd.  
The William Kennedy & Sons, Ltd.**Car Dumps:**Canadian Mead-Morrison Co.  
Herbert, Alfred, Limited.  
Holman Bros., Ltd.  
Sullivan Machinery Co.**Cars:**Canadian Mead-Morrison Co.  
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John J. Garthshore.  
Peacock Brothers, Limited.  
The William Kennedy & Sons, Ltd.**Car Pullers:**

Canadian Mead-Morrison Co.

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Holman Bros., Ltd.  
Hull Iron & Steel Foundries, Ltd.  
John J. Garthshore.  
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Jones &amp; Glassco, Reg.

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The William Kennedy & Sons, Ltd.**Castings (Iron and Steel):**Herbert, Alfred, Limited.  
Holman Bros., Ltd.  
Hull Iron & Steel Foundries, Ltd.  
Peacock Brothers, Limited.  
The William Kennedy & Sons, Ltd.**Cement Machinery:**Hadfields, Limited.  
Hull Iron & Steel Foundries, Ltd.  
The William Kennedy & Sons, Ltd.**Chains:**Jones & Glassco, Reg.  
Canadian Link-Belt Co., Ltd.  
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Jones &amp; Glassco (Regd.)

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Hans Renold of Can., Ltd.  
Jones & Glassco (Regd.).**Chemist:**Thos. Heyes & Sons.  
Milton Hersey Co.  
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Everitt &amp; Co.

**Crusher Jaws:**Canadian Steel Foundries, Ltd.  
The William Kennedy & Sons, Ltd.**Crushing Rolls:**Canadian Steel Foundries, Ltd.  
The William Kennedy & Sons, Ltd.**Classifiers:**

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Nova Scotia Steel & Coal Co.**Coal Cutters:**Sullivan Machinery Co.  
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Holman Bros., Ltd.  
Peacock Brothers, Limited**Coal Crushers:**Canadian Link-Belt Co., Ltd.  
Peacock Brothers, Limited.**Coal Mining Machinery:**Canadian Ingersoll-Rand Co., Ltd.  
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Denver Rock Drill Lfg. Co., Ltd.  
Sullivan Machinery Co.  
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Hendrick Mfg. Co.  
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Holman Bros., Ltd.  
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Jones & Glassco, Regd.  
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Hull Iron & Steel Foundries, Ltd.  
The William Kennedy & Sons, Ltd.**Gears, Machine Cut:**The Hamilton Gear & Machine Co.  
The William Kennedy & Sons, Ltd.**Gold Refiners:**

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Holman Bros., Ltd.  
Jones & Glassco, Regd.  
Mine & Smelter Supply Co.  
Canadian Link-Belt Co., Ltd.  
Peacock Bros., Ltd.  
Sullivan Machinery Co.**Holisting Towers:**

Canadian Mead-Morrison Co.

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Belliss & Morecom, Ltd.  
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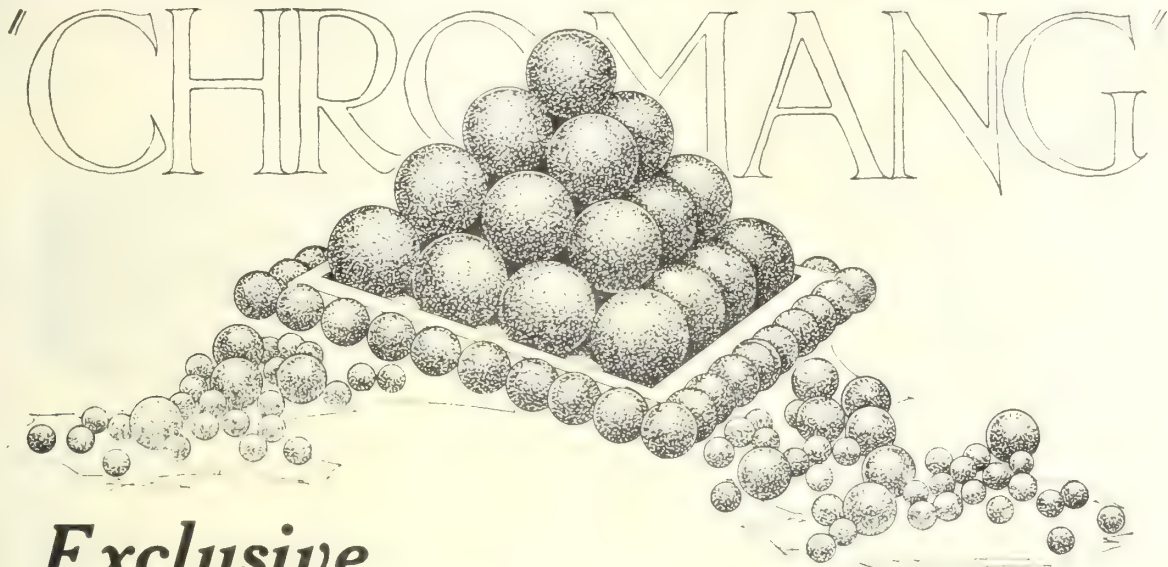
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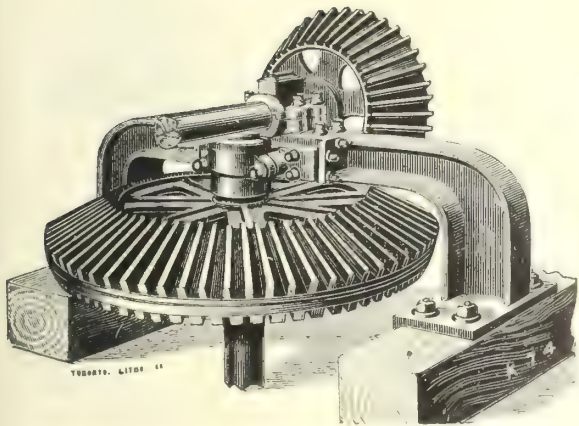
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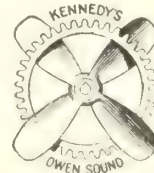
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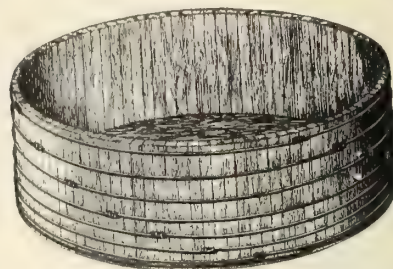
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# Minerals

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## Economic Minerals.

In addition to the above, practically all economic minerals (coal and tin excepted) are found in Ontario:—actinolite, apatite, arsenic, asbestos, cobalt, corundum, feldspar, fluor-spar, graphite, gypsum, iron pyrites, lead, mica, molybdenite, natural gas, palladium, petroleum, platinum, quartz, salt, talc and zinc. This Province has the largest deposits on the continent of talc, feldspar, mica and graphite.

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Preliminary returns show the output of the mines and metallurgical works of the Province for the year 1921 to be worth \$48,128,387, of which the metallic production was \$27,574,202.

The following figures show the rapid growth of Ontario's mineral industry by five-year periods since 1891:

| Year.        | Value.      | Year.        | Value.       |
|--------------|-------------|--------------|--------------|
| 1891 .. .. . | \$4,705,672 | 1906 .. .. . | \$22,388,383 |
| 1896 .. .. . | 5,235,003   | 1911 .. .. . | 41,976,797   |
| 1901 .. .. . | 11,831,086  | 1916 .. .. . | 65,303,822   |

## Dividends.

Dividends and bonuses paid to the end of 1921 amounted to \$23,140,734 for gold mining companies, and \$84,388,185 for silver mining companies or a total of \$107,528,919.

## Mining Regulations.

A miner's license costs \$5.00 per annum, and entitles the holder to stake out in any or every mining division three claims of 40 acres each. After performing 200 days' assessment work on a claim, patent may be obtained from the Crown on payment of \$2.50 or \$3.00 per acre, depending on location in unsurveyed or surveyed territory.

## Assay Office.

The Provincial Assay Office at No. 5 Queen's Park, Toronto, is maintained by the Department of Mines for the free identification of minerals, free assays under the provisions of the Mining Act of Ontario, and also for general assay work as per the Schedule of Charges which may be obtained on application.

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The Department maintains, at Cobalt, an ore sampling and testing laboratory which is now prepared to receive parcels of gold ore from 100 pounds upward, and after sampling and assaying the same to pay to the shipper the value thereof, less treatment charges. The purpose is to afford a market for ores extracted by prospectors and others in developing their mining claims, enabling them to obtain funds which they can use for further work and to report on the most satisfactory method of treatment. Fuller information may be obtained on application to the Manager, Temiskaming Testing Laboratories, Cobalt, Ontario.

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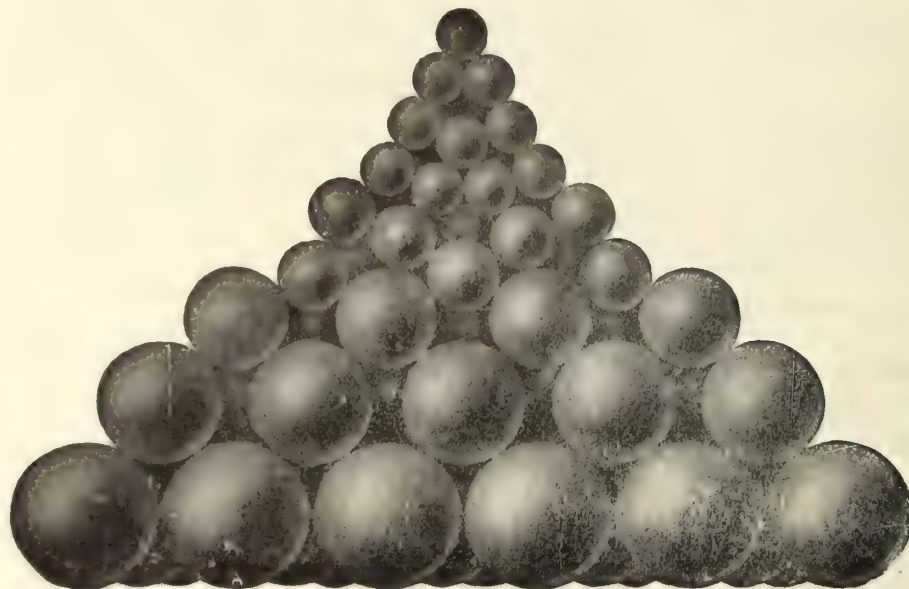
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No. 13

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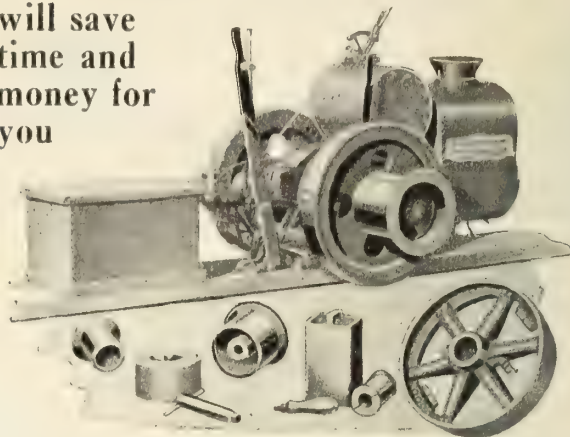
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# -:- EDITORIAL -:-

## PREMIER MINE REPORT

We are pleased to have for publication today, through the courtesy of Mr. H. A. Guess, his first formal annual report of the operations of the Premier Mine, of which he is vice-president and managing director. We are especially happy to include this report in our pages because it presents such a pleasant contrast to the financial management of some other mines upon which it is our duty to comment from time to time. Not only does the report deal with a phenomenally successful mining venture, but it also constitutes a model of straightforward mine management and accounting, concealing no essential detail, conveying no false impressions, and stating unfavourable as well as favourable aspects of present and future operations with an impartiality that marks the high value placed upon their own professional reputations by the men concerned in the direction of the mine's destinies. Of the seven directors, Mr. W. R. Wilson and Mr. R. W. Wood, both of Fernie, B.C., as well as Mr. Guess, are Canadians. All are decided assets to Canada's mining industry.

With broken ore in the stopes to a value of 2½ million dollars and ore blocked out but not broken estimated at 9½ million dollars, the immediate future of the mine is assured. The unexplored portions both of the veins being worked and of the ore-bearing zone within the limits of the company's property offer additional possibilities for profitable mining. But Mr. Guess says plainly that the extraordinarily high-grade ore that has made the mine famous does not occur below the third level, nor is it likely to be found at a greater depth beneath the surface. It is not known to what depth the milling ore will extend.

It appears now that in this newest camp of the Portland Canal district, as in most other mining districts, the larger part of the production will be won from ore of moderate or low grade. Hence Mr. Guess' warning that the high-grade ore is due to surface enrichment and persists only to comparatively shallow depths need not be considered discouraging. The plans of the Premier company evidently contemplate the use of their ore of lower grades long after the bonanza shoots are worked out. Several other properties in the vicinity already show ore of moderate grade in at least moderate amount, and we can hope logically that ore of average grade, even if not of the bonanza variety, will feed a number of flourishing concentrating mills within the near future.

## THE PIERIAN SPRING

That respectable and elderly daily newspaper, the "British Whig," Kingston, Ont., recently turned its editorial attention to the discovery of gold in Rouyn township, Quebec. Gravely, sadly, and reprovingly the estimable "Whig" moralized on the wickedness of the "mad rush" of prospectors and adventurers "to that barren piece of land in the wastes of Quebec." A lofty note was struck in these monitory sentences: — "All are going with the same high hope of making a rich strike. Many of them are forsaking their homes, and are staking everything they own on the chance that they will be amongst the favoured ones to strike a *yellow pocket* and return with *fabulous riches*. They are prepared for *hardship and suffering* in order that they may not lose the opportunity of a gamble with the precious metal which stands for so much in the world to-day." (The italics are our own.)

More moralizing follows. It is pointed out in one ever-to-be-remembered sentence that "there is something of the prehistoric in the way in which men grovel in the soil." California and the Yukon are alluded to. "Shattered hopes" and "wearied frames," according to the "Whig," will be the inevitable guerdon of the ill-advised seekers after "yellow pockets." We too are sure that this will be the case if the "adventurers" are stupid enough to "grovel in the soil."

Alas, we fear that the "Whig" is living in the melodramatic past. Its ideas of prospects and prospecting belong to another age. They are antedated by about three-quarters of a century. Gold miners do not nowadays expect or look for fabulous riches from "yellow pockets" in Quebec or elsewhere. Nor are hopes based upon striking the "vein which is supposed to run through the district." Nor do men get rich by selling "false veins" — whatever that may mean. Nor are there any dangers on the trail or in the camp. Nor yet are there any considerable hardships. The sad fact is that the "Whig" has been writing nonsense about a subject of which it is painfully and patently ignorant.

The "Whig" should know that the mining engineer, the geologist, and the trained prospector have made gold mining safe for democracy. We regret that it is our duty to tone down the lurid colours of the "Whig's" picture. The prospector is a well-fed, well-paid individual, who is by no means given to "staking his all" on one field. The natural desire to get in ahead of the other man the "Whig" will find exem-



plified in every walk of life, — at the ticket offices of theatres, in retail establishments, and, particularly, in politics. We venture to say that in any one of our periodical political campaigns there is more money wasted, misapplied, and misappropriated than in a dozen "wild rushes" to new gold territory. And from the gold rushes the country *does* get some benefit.

The well-provisioned prospecting party of to-day needs no commiseration and deserves no reproach. The useless, or mischievous, hanger-on is rapidly passing out of existence; what evidence there is of his activities is provided in great part by noxious stock advertisements published in our daily newspapers.

Perhaps the "Whig" will find food for thought in this.

### BRITISH EMPIRE STEEL REPORT

The affairs of Canada's greatest single mining and metallurgical company were treated with frankness and decision last week at the annual meeting of the British Empire Steel Corporation. President R. M. Wolvin's proposal to reduce the capitalization by half, to \$250,000,000 was approved heartily by the shareholders. Labor conditions in and about Sydney were discussed at some length and measures proposed with a view to closing the present breach between the company and its workmen. The report of an unsatisfactory business year during 1922 was followed by a forecast of better results during the present year.

From the beginning it has been commonly realized that the \$500,000,000 capitalization is badly out of proportion to the earning capacity, either present or prospective, of the corporation's constituent companies. The corporation holds tremendous and invaluable assets in its coal seams in Cape Breton and its unique beds of ore in Newfoundland. An attempt was made to justify the capitalization on the basis of these assets — an attempt without justification, as the time factor was ignored. The assets contained in these deposits of coal and iron ore can be realized at an annual rate that is almost infinitesimal in comparison with their extent. Hence a soundly based balance sheet must discount the present value of these assets to a degree that is hardly believable until demonstrated mathematically.

This reduction of the capital stock not only tends to satisfy the demands of sound accounting, but also is calculated to affect materially the attitude of the corporation's workmen. These men have believed, and rightly, that the profits reaped by the corporation from their daily toil were to be applied as dividends on "watered" stock. Insofar as "watered" stock was issued and paying dividends, either before or since the organization of the present corporation, the workmen were being imposed upon and a morally illicit tax put

upon their industry. Now, happily, a large part of the recently added cause for fear has been removed, though the financial dilution of the stock of some of the original companies of necessity remains.

The promise of a rise in wages to the steel workers should conditions permit is a palliative of more temporary nature, though its effect should be distinctly salutary. It is a natural and inevitable sequel of the rising wages in the steel mills of the United States. The suggestion of still further rises in wages, should the steel company's earnings warrant it, is of more far-reaching importance, and should the directors mean it and the workmen accept it, as a promise, there is no doubt that the labour problem at the mills will be well on the way to solution.

Those conversant with both sides of the labour tangle at Sydney realize well the fact that most of the demands made on behalf of the labour unions there have been instigated by and formulated by professional leaders of revolutionary tendency. This has been abundantly evident during the last year or more. Sydney and the surrounding industrial communities have become the happy hunting ground of professional agitators, who up to the present have remained immune from the process of law to which their actions make them morally, even if not legally liable. The directors have with justice refused to consider the demands of unions at present under the control of these leaders. Some of the demands doubtless have reason on their side; but all must be refused until such time as the local unions are directed by safe and sane leaders, more nearly representative of the true character of Canadian workmen.

The review of the physical condition of the corporation's coal mines is particularly satisfactory. A substantial capital investment has been made for the double purpose of ensuring a long and secure life for these under-sea collieries and of providing for the more economical working of the seams. When the plans now inaugurated have been completed, the collieries of Nova Scotia will rank with the best in any land in point of effective engineering management.

One of Mr. Wolvin's announcements that holds great possibilities for the future both of his corporation and of Canada is that dealing with the manufacture of coke for household use. There is no reason to doubt that the recent proposal of the Dominion Fuel Board is commercially feasible, and the obvious point of attack in substituting this native fuel for imported anthracite would be Montreal. Recent advances in coke-oven practice have reduced the cost materially, so that the manufacture of coke for domestic use is now an even more attractive proposal than it was when the existing successful plants for that purpose were established. We hope the British Empire Steel Corporation may find it feasible to erect a coking



plant in Montreal as a means both of expanding its own earning capacity and of extending its usefulness to Canada.

### TEMISKAMING TESTING LABORATORIES

Some months ago we drew attention in these columns to the fact that the Temiskaming Testing Laboratories at Cobalt, operated under the direction of the Department of Mines, Toronto, is prepared to extract the gold from small lots of ore, to return to the owner the value of the bullion less treatment charges, and to give a full report on the method of treatment indicated as advisable by the tests. It is now announced in addition that shipments of larger size will be acceptable to the Laboratories, and that special freight rates on any trial shipments of ore to Cobalt have been arranged with the T. & N. O. Railway.

This facility offered to prospectors and others developing their claims promises to be of distinct value to our growing mining industry. Twenty-five years ago the stamp-mill at the School of Mining, Kingston, was used extensively for the same purpose and was highly appreciated by the pioneers in the gold fields of that time. In Australia a variant of the same idea in the form of portable stamp-mills has proved eminently useful to their gold industry, at a comparatively slight public expense.

The testing of the gold ore of prospects from the various camps at the government laboratories in Cobalt should prove to be a valuable adjunct to the work of the provincial geologists. The directing of an embryo mining camp's destinies rests to a considerable extent on the judgment and the field researches of these public servants. Should the results of mill runs from promising prospects be made available to them in addition, their conclusions will be made the more valuable. In this case, as always, the staff of the Ontario Department of Mines can be relied upon for absolute discretion in their use of private information.

In another line of endeavour, that of assaying gold samples, the Temiskaming Testing Laboratories appear, in their zeal in the public service, to have infringed upon private rights. It is eminently desirable that the officials of the Department of Mines should have early and accurate knowledge of developments in the gold fields, that they may perform their public services the better. With this end in view the Laboratories at Cobalt have offered very attractive rates for assaying to prospectors and others. This would be "all to the good" were it not for the existence of independent custom assayers, one of the most valuable human adjuncts to a gold mining camp. It is said that the public laboratory has cut prices to a point that the private laboratory cannot possibly meet. If on investigation it should be found that the publicly subsidised Temiskaming Testing Laboratories now compete thus

unfairly with the custom assayer, the rates should be adjusted to provide for strict justice to the private citizen.

The editorial on Argonaut financing that appeared in these pages two weeks ago, has drawn a vigorous rejoinder from Mr. John E. Hardman, formerly consulting engineer for the company, in the form of the letter we print today. This letter was published in the Montreal "Star" last week, the day after we received it, with the acknowledgement that it was addressed to the "Journal". Our columns are, of course, open to present both sides of a question. Mr. J. H. Rainville, president of Argonaut Gold, Ltd., will avail himself of this privilege next week to give some facts about his company. Though Mr. Hardman's letter is couched in terms that call for a reply, we shall wait until next week to expound further our views on the subject. We await Mr. Rainville's letter with interest.

Tangible evidence of the growing interest taken by substantial London mining investors in Canadian mines is afforded by the press despatch announcing the sale of the Daly-Alaska property to a group represented by Mr. S. S. Denny. This property is, by the accident of the international boundary, in the United States; but it forms one of the group of promising near-mines surrounding the Premier. The camp promises to be an international one, with twin ports at Hyder, Alaska, and Stewart, B.C. Fortunately for Canada, the major part of the mineralized zone as disclosed thus far is east of the boundary.

### THE DIVINING-ROD MAN

He was a man of dignity. His mien  
Was mystical, detached, as if he'd seen  
The Apocalyptic mysteries revealed,  
Or glimpsed the awful Judgment Book unsealed,  
Or was familiar with the spirit world.  
His whiskers were elaborately curled.  
His nose was slightly carmined at the end;  
Not less than seven drinks made him unbend.  
His coat was of ecclesiastic cut;  
He might have passed as missionary, but  
The hat he wore, a Stetson, wide and black,  
Seemed worldly, raffish, strangely out of whack.  
His rod consisted of two whalebone strips,  
Bound tight together at the outer tips.  
With this device he could discover veins,  
Thus obviating all prospecting pains.  
When, half deceiving and half self-deceived,  
He passed away, I doubt if any grieved.  
His day has passed, his type lives on forever:  
Though I don't think the present kind so clever.

J. C. M.



# PREMIER MINE

FIRST PUBLIC ANNUAL REPORT TO STOCKHOLDERS

The following report of Mr. H. A. Guess, vice-president and managing director of the Premier Gold Mining Company, is reprinted from the annual report sent this year to stockholders and made available to the public for the first time. It is dated March 5th.

Although your Company has been in existence for some four years, annual reports heretofore have been merely an informal sort for the reason that there were only 12 or 14 stockholders and these stockholders were all of them in close touch with the current operations of the mine. However, during the past year a small amount of stock (some 2%) has been purchased by various parties not heretofore interested in the Company, and it has therefore seemed advisable to make a formal and detailed statement covering the operations of the year 1922.

The Premier property, comprising 19 mineral claims and fractions, is located in British Columbia, adjoining and just to the northeast of the International Boundary Line between Alaska and British Columbia, and is about 11½ miles almost due north from the town of Hyder, Alaska, which with the adjoining town of Stewart, B.C., on the Canadian side of the line, is located at the head of the Portland Canal. In the body of this report will be found a map showing the Premier Group of mining claims which shows also the location of the development and mining work so far done upon the property. Also another map is embodied in this report showing in plan and section, the workings upon the Premier property as at December 31, 1922.

In addition the Premier Company owns some mining claims which adjoin its main property to the Eastward and it also owns 542,469 shares out of a total authorized issue of 1,500,000 shares of the B. C. Silver Mines, Ltd., which latter Company owns a number of mining claims both to the north and south of the Premier Group.

The orebodies so far discovered and opened up on the Premier are three, two of which are the more important so far and have a northeasterly trend and a northwesterly dip and occur as replacements in quartz porphyry in proximity to andesitic tuffs, also sometimes within the tuffs. These two more important bodies appear, in the light of the development as at present, to merge together their southwestern ends and to the northeastward lie more or less parallel and from 50' to 100' apart.

A large amount of underground diamond drilling has been done with marked success, as a guide for the development work and there are indications from the diamond drilling so far that one or more additional zones of this same northeastward trend may be opened up within the area now under development; but these from present indications, if found to be definite zones will be more likely to be of milling or medium grade ore than of high grade.

The third body within the area under present development has a strike almost at right angles to the other two, namely, to the northwest and a dip to the

southwest. This third body, while showing irregular shoots of good grade ore, has so far been erratic and buncy in its assays and no particular tonnage has as yet been opened up or figured upon. Surface outcrops and shallow cuts at various points to the northwest on the Premier property, give reason to believe that this vein of northwest strike is quite persistent and some 2,500' to the northwest of the main workings lies the Bunting Tunnel, which was started before its acquisition by the Premier to explore this northwest orebody, and it is contemplated, beginning this year, to drive possibly from the Bunting Tunnel upon this northwest orebody to ascertain what, if any, ore of milling or shipping grade it may contain. Work upon this, if started from the level of the Bunting Tunnel could be utilized to thoroughly explore this northwestern vein and at the same time by the continuation of that exploratory drift some 2,500' to the southeast, it would tap the main Premier orebody upon its dip, at a vertical depth of approximately 500' below the fourth or present bottom level of the Premier workings, and would thus drain and facilitate the opening up of the Premier orebodies to that depth, provided future explorations show the orebodies to carry commercial ore to that depth.

There are other surface showing upon the Premier, as yet unexplored, notably upon the Pictou and Cascade Falls No. 8, which will in due course of time be investigated, doubtless by crosscutting to the south from the present bottom level of the Premier main workings.

The Premier property is equipped with an excellent mining plant, a concentration and cyaniding mill of around 4,000 tons monthly capacity and an aerial tramway whose upper terminal is just below the present bottom level of the Premier mine, and alongside the mill, and whose lower terminal ends in a 1500 ton ore bunker, divided for first class and second class ores, at deep tide water at Stewart, B.C., the tramway being approximately 12 miles long, which is one of the longest, if not the longest, tramways for ore in existence. The tramway has a capacity of around 10,000 tons monthly.

The Premier is equipped with a water power plant, developing around 900 H.P. during the months of May to November, inclusive, and during winter months from December 1st to May 1st, the water power is variable, dropping to as low as 200 H.P. during very cold weather, and the power during these months is supplemented by semi-Deisel engines, the oil being pumped from tank steamer at Stewart to storage tank above the lower terminal of the tramway and thence transported in drums over the tramway and distributed by tank and pipes from the upper terminal to engines.

A summary of mining operations for 1922 is as follows:

|                                                |         |
|------------------------------------------------|---------|
| Diamond Drilling (feet) . . . . .              | 12,279  |
| Development Drifts and Raises (feet) . . . . . | 6,502   |
| Ore Mined (dry tons) . . . . .                 | 102,334 |
| Ore Milled (dry tons) . . . . .                | 32,344  |



|                                                            |           |
|------------------------------------------------------------|-----------|
| Ore Shipped Tacoma (dry tons) . . . . .                    | 41,775    |
| Ore Shipped Granby (dry tons) . . . . .                    | 28,215    |
| Table Concentrates Shipped Tacoma (dry tons) . . . . .     | 2,511     |
| Flotation Concentrates Shipped Tacoma (dry tons) . . . . . | 1,614     |
| Precipitates Shipped Selby (tons) . . . . .                | 13        |
| Bullion Shipped Selby (Avoid. pounds) . . . . .            | 908       |
| Ounces Gold Produced . . . . .                             | 127,827   |
| Ounces Silver Produced . . . . .                           | 4,474,367 |
| Ore Broken, 1922 (tons) . . . . .                          | 163,094   |
| Broken Reserve December 31, 1922 (tons) . . . . .          | 73,000    |

"A conservative estimate of the general average of the 73,000 tons broken in stopes as at December 31, 1922, is: .72 ounces gold and 32.0 ounces silver per ton. With gold figured at \$20. per ounce and with silver at 65c this represents a gross value of \$35.20 per ton.

"A conservative estimate of the assured and probable unbroken ore to the present bottom level of the present mine workings is 300,000 tons, averaging .71 ounces gold and 27.0 ounces silver per ton. With gold figured at \$20. per ounce and with silver at 65c this represents a gross value of \$31.75 per ton.

"The orebodies of the Premier within the area of the present workings have maintained their widths to the present bottom level and in fact have widened somewhat, the average width in the bottom level being around 15' and with a length, as far as opened up, of approximately 500'. The average value of the ore has, however, dropped to a milling grade on the bottom level, the value there being approximately .32 ounces gold, 5 ounces silver and although no development other than by diamond drilling has been done below the bottom level, six diamond drill holes, cutting the orebody at various points to a depth of about 100' below the bottom level, have shown a continuance of approximately the same average grade.

"The foregoing tonnage estimates do not represent the total probable tonnage from the Premier property, but refer to the total probable tonnage within the limits of the present mine workings. There is some 600' of unexplored ground to the eastward of the present mine workings and along the same ore zone. Also there are possibilities along the southwestward of the same zone, beyond the present mine workings as well as the possibilities of the vein, with the northwesterly strike and of the various surface showings elsewhere upon the Premier property, some of which, such as upon the Pietou and Cascade Falls No. 8 claims, have been previously mentioned.

"It is desired, however, to make clear to all the stockholders that the very high grade ore—due doubtless largely to secondary enrichment—within the limits of the present mine workings, does not, judging from results of development work to date, live down much, if any, below the point at which the third level is now being started, about midway between the second and the bottom or fourth level, this No. 3 level being approximately 600' vertically below the surface.

"Should the southwestern trend of the Premier ore bodies, beyond the present mine workings be found by further development and exploration to carry commercial orebodies, it is possible that these bodies may show high grade ore at points below the present bottom level, due to the surface contour, the ground sloping toward the southwest, and upon the south-

western trend some 2,000' within the limits of the Premier's property, remains as yet unexplored."

In addition to the above report from Mr. Guess, there is included a balance sheet, a summary account, a property map, and a plan and longitudinal section of the mine workings.

The balance sheet shows, against capital of \$5,000,000 and current liabilities of \$1,142,613, a surplus of \$1,246,829; cash and other current assets, \$1,590,827; mining property and equipment valued at \$4,274,781; and \$129,454 invested in B. C. Silver Mines stock. The sum of \$2,688,277 was written off during the year for depreciation and depletion—over half the sum of the capital stock.

The summary account shows total earnings from ore, \$4,782,885, at an operating cost of \$1,022,506, leaving total net earnings of \$3,760,605. From this is deducted \$2,321,149 for administrative expenses, taxes, depreciation and depletion, and \$65,818 for profit and loss deficit, leaving as balance available for dividends, \$1,373,637. Administrative expenses were \$6,886. By adding the balance available for dividends and return of capital through the amounts set aside for ore depletion and depreciation to the extent of \$1,399,488, the total of the four dividends paid during the fiscal year is reached as follows:

|                           |           |
|---------------------------|-----------|
| March 30th, 1912. . . . . | \$515,625 |
| June 29th, 1922. . . . .  | 757,500   |
| Sept. 29th, 1922. . . . . | 750,000   |
| Jan. 3rd, 1923 . . . . .  | 750,000   |

\$2,773,125

The longitudinal section of the mine workings indicates that almost all the stoping in the mine has been done above No. 2 tunnel, 400' below the outcrop. No. 4 tunnel, 400' below No. 2, has afforded access to the mineralized zone at this depth. No. 3 tunnel between 2 and 4, is now being driven, as Mr. Guess mentions above, to tap what is judged to be the bottom of the high grade shoots.

A profile of the 12-mile tramway suggests the difficulties that attended its construction.

#### POSSIBLE ORES OF POTASH AND ALUMINA

Alunite, or alumstone, a hydrous sulphate of aluminium and potassium, contains in its pure state 37 percent alumina and 11 percent potash. The most extensive deposits known are those near Marysville in Utah, where several million tons have been determined. The mineral is a potential source of both potash and alumina, and is amenable to comparatively simple treatment.

Potash feldspar (orthoclase and microcline) which occurs in abundance in several parts of Canada, contains in its pure state 18.4 percent alumina and 16.9 percent potash, with a combined potential value at present prices slightly below that of the same constituents in alunite. Should an economical process for resolving potash feldspar into its constituent parts be found, the comparative accessibility of some of the Canadian feldspar deposits will put them in a favorable position for manufacture.

Anorthite (lime feldspar) contains in its pure state 36.7 percent alumina, the remainder being silica and lime. Large deposits of this mineral are available in Canada. It is possible that some simple process might be found whereby this alumina might be made commercially available. The minerals containing potash in addition to alumina are, however, at present in the more favourable position for manufacture.



## FELDSPAR SPECIFICATIONS

A special committee of the American Ceramic Society has drafted and submitted for discussion provisional specifications for commercial feldspar.

The Committee's draft is instructive, but somewhat sketchy and incomplete. Preliminarily attention is called to the fact that feldspars of definitely different composition and of definitely different grinding characteristics are in use. "The consumers" it is stated "are a unit as regards specifying the characteristics of the spar they purchase. As might be expected, the producers see many difficulties in the way. However great and real these difficulties are, they must be surmounted to the end that the industries which give the spar its value may enjoy a greater measure of freedom from uncertainty and consequent loss."

### Specifications for Feldspar for Manufacture of Whiteware

1.—**Sampling**—Directions are given that, in sampling carload lots, equal amounts should be taken from at least five different points in the car; no two samples being taken within five feet of each other. In sampling from a bin, five separate samples shall be taken from different portions of the bin and not more than two from the same level. The total sample shall not be less than ten pounds.

(COMMENTS.—Obviously these directions are intended for the consumer rather than for the producer. I suggest that there is always danger in sampling the surface of carload lots. What should be insisted upon is well-timed sampling during the process of loading and during the process of unloading. In no other way may the samples of producer and consumer be fairly considered as mutually checking each other. I also should place the minimum weight limit of a representative carload sample at fifteen or twenty pounds. Ten pounds is too small for safety. In the case of sampling bins it is much easier and more practicable to sample the feldspar when it is being put in the bin.

The subsequent directions for handing and quartering the sample are not sufficiently explicit as to crushing before quartering.)

2.—**Chemical Composition** — Specifications as to chemical composition are based wholly upon alkali content. They are as follows:

| Grade  | K <sub>2</sub> O% | Na <sub>2</sub> O% | CaO. | MgO%      |
|--------|-------------------|--------------------|------|-----------|
|        | above             | below              |      | not above |
| A..... | 10%               | 3.6%               |      | 0.75%     |
| B..... | 9%                | 3.2%               |      | 1.00%     |
| C..... | 7.8%              | 2.8%               |      | 1.00%     |
|        | not above         | not below          |      |           |
| D..... | 3%                | 7%                 |      | 1.00%     |

(COMMENTS.—It is to be regretted that iron content is not included in this table. A rough indication of the maximum limits acceptable for various uses would be instructive. However, this is a matter fraught with many perplexities and complications. The state in which the iron content is found has much to do with the acceptance or rejection of feldspar. This also has an important bearing upon the requisite fineness of grinding. No doubt this will be fully dealt with at a later date; but, in the opinion of the commentator, it would have been well to have touched at least generally on this important feature here. Again, there seems to be a tendency to consider the whole matter only from the point of view of the consumer.

As the consumer already has too much latitude, this tendency must be corrected.)

3.—**Physical Properties and Tests**.—The question of colour and specking is left open to agreement between vendor and vendee.

Directions for testing the fineness of grain in ground material, for determining moisture content in ground material, and for determining fusion behaviour, are given.

COMMENTS.—The only item in this group of specifications that touches directly on the producer is a clause stipulating that shipments shall be made in clean, closed cars. The right is reserved to the purchaser to reject and return the shipment if it be not up to specifications in every respect. It is well to reiterate the fact that specifications will be only a source of trouble and dispute if the producer is not actually helped and safeguarded by them. They can also be safeguards to the consumer. But the consumer does not need protection in the same sense in which the producer needs it. Therefore it will be desirable to draw up explicit directions for the producer so that he will be able intelligently to meet the requirements of each branch of the trade. Simple and easily applied precautions taken before and during the loading of shipments from the quarry will be the best form of insurance.)—J. C Murray.

## CANADIAN PRESIDENTS OF A. I. M. E.

In the March 16th issue of the "Journal" it is said that Mr. E. P. Mathewson is the second Canadian-born president that the American Institute of Mining and Metallurgy has had. This is not correct as he is the fourth Canadian-born among the forty-four that have held office in the Institute since it was founded in 1871.

Of the four, the first to be elected to the office was Richard P. Rothwell "born May 1, 1836, at Oxford, Upper Canada (now the Province of Ontario)." He was also one of the founders, if not the real founder, of the Institute, as the following quotation from the biographical notice in the Transaction shows; "Yet when I say of him that he was one (and in many respects the most influential—I have reason to believe that the plan originated with him) of the three founders of the Institute; that he practically created, or, at least, developed to its full strength and scope, the 'Engineering Journal,' as the recognized organ of the technical practice and the business interests of mining and metallurgy; and that he conceived and successfully maintained the colossal undertaking of that annual cyclopaedia, the 'Mineral Industry,' I say enough to indicate for him a foremost place among the leaders of professional progress." In 1872, 1873 and 1877 Rothwell was a vice-president of the Institute, "but it was not until 1882 that, without any suggestion on his part, he was unanimously elected president." Rothwell died April 17th, 1901.

Dr. James Douglas, president of the Institute 1899-1900, was born in Quebec city in 1837 and passed away in 1918. His work and the great influence he exerted in the metallurgical world, especially what he did to overcome "secrecy in the arts," is well known to most readers of the "Journal." It may be added that during Dr. Douglas' presidency a joint excursion was made, from the city he loved so well, Quebec, by the American and Canadian Institutes to the mines and metallurgical works of Nova Scotia.



Mr. David W. Brunton was president of the Institute 1909-10. The following biographical notes concerning Mr. Brunton are taken from Mr. T. A. Rickard's "Interviews with Mining Engineers" that were published in the "Mining and Scientific Press" but have since been collected and issued in book form. Mr. Brunton was born at Ayr, Ontario, Canada, in 1849, and began his engineering career in Toronto. "In the first place, Mr. Brunton has been accepted as a leader among men, having been president of the American Institute of Mining Engineers. To this mark of distinction we venture to add the statement that in accomplishment and reputation he stands second to no mining engineer in the English-speaking world."

Since the fourth president, Mr. Mathewson, is so well known among us it is unnecessary to comment on his career or characteristics. He will be seen at his best the coming summer leading the cohorts of the American Institute on the excursion to the great triumvirate—Sudbury, Cobalt and Porcupine—to Kirkland Lake and elsewhere in Ontario, to the asbestos area of Quebec, and to his native city where old Mount Royal early smiled on the infant Mathewson.

W.G.M.

## LETTERS FROM READERS

### Argonaut

To the Editor,  
Canadian Mining Journal,  
Sir:—

The virulent and unwarranted attack upon Argonaut Gold, Ltd. made in an editorial in your issue for March 16th, calls for notice and for prompt denial by people who really know the property.

It is impossible for people who know your own literary style to assume that this editorial came from your pen; rather it bears the imprint of a mind that has been grievously disappointed in its endeavor to levy a contribution from the Argonaut treasury.

As the son of one of Canada's most learned chemists, and a graduate of Queen's, you must know that the presence of chalcopyrite in the ore is no unsurmountable obstacle, and that it does not "make the extraction of the gold difficult and expensive." The metallurgical treatment of this ore was clearly worked out by the writer in the old mill (subsequently burned down) during the summer of 1919. Since copper and its oxidized compounds are great consumers of potassium cyanide, they must be removed before cyaniding the ore, and their removal is neither "difficult" nor "expensive."

The article is simply full of misconceptions regarding the property of Argonaut Gold, Ltd., and it should be corrected; this the writer is able to do since he is primarily responsible for the acquisition and development by Argonaut of the old "Huron" property. His first examination was in November 1918; he spent 6 months in 1919 on the property, starting the development along the present lines, and remained "au fait" with all the development down to and beyond the 350-foot level. Of the 500-foot level he cannot write personally, since that work was done after he resigned as Consulting Engineer.

Your editorial statement that "All the evidence available indicates that the mine management will have its hands full paying working expenses and interest on the small amount of capital invested in mine and mill" simply shows that your informant is particularly poor in acquiring evidence, and surprisingly ignorant of values and ton-

nage as developed at the Argonaut. He may, perhaps, belong to that ancient class that still believes "Where ignorance is bliss 'tis folly to be wise"—but his ignorance does not excuse your editorial pencil.

As to there being "only a remote chance of there ever being a surplus for the payment of dividends" the public must take this statement as merely a personal one; time, limited to the balance of the year 1923, will prove him a liar or a true prophet.

The average value of the ore on the first or 85-foot level is \$14.00; the average value of the ore on the 200-foot level is \$15.35; the average value of the ore on the 350-foot level is \$20.00 per ton. These figures are a matter of personal knowledge to the writer; the values obtained on the 500-foot level are not of personal knowledge, but there is no reason to question the honour, or probity, of John W. Morrison, Supt. who reports them to be in excess of \$25.00 per ton.

Now the published statements of the companies operating in Kirkland Lake District show that the total costs or operating expenses at the mine (excluding head or city office expenses) run about \$6.00 per ton; since Argonaut has to concentrate its deleterious copper and remove it before cyaniding let \$1.00 per ton be added. With a cost of \$7.00 and a lowest production of \$14.00 how does your remarkable informant, Mr. Editor, deduce that from a profit margin of \$7.00 per ton "there is only a remote chance for the payment of dividends?"

The paragraphs which refer to "squeezing out" any shareholders," to "re-organization of the Company," to "running a bluff" and similar phrases (which only show a remarkable control of verbiage) do not deal with facts.

The writer can say positively, that there has been no re-organization; that none of the extra million shares added to the capital will be put on the market; that the directorate instead of "running a bluff" have been careful and have conserved all the interests of the shareholders; that your informant is invited to specifically state in what way the action of the directorate has been wrong.

The writer was connected with the opening and development of this mine beginning in the Spring of 1919. To some of your readers he is a man who has never been accused of optimism,—rather the reverse. But with the amount of unusually high-grade ore that is now opened on the Argonaut, and with the management obtaining on the property at the present time, it is the duty of someone to correct the exceedingly false impression intended to be conveyed by your article, which is entirely unworthy of the past history both of the "Canadian Mining Journal" and of yourself. I may add that I hold no shares in Argonaut myself.

John E. Hardman

Montreal

## CORRECTION

In the review recently of the book "Briquetting," by Alfred L. Stillman, the address of the publishers, the Chemical Publishing Co., was given as Scranton, Pa. This should have been Easton, Pa.

Afghanistan is one of the few countries in the world without railways. A contract has been let lately to an Italian firm for a weekly motor service for passengers and freight between Peshawar, in northern India, and Kabul, the capital of Afghanistan.



# THE NEW NORTHLAND

A DESCRIPTION OF PART OF NORTHERN ONTARIO AND TWO OF ITS INDUSTRIAL PIONEERS

(The following is extracted from a volume "The Garden City Press", by J. J. Harpell, which has just been published. The object of this volume is to describe the activities at the Garden City Press at Ste. Anne de Bellevue and Toronto, and the objects towards which these activities are directed. One of the principal objects is to stimulate and aid the rational development of our national resources of all sorts, and the succeeding paragraphs serve to outline the possibilities of development that these resources offer in one corner of Canada.—Ed.)

Before the advent of the railroad, all settlement and hence all industry and commerce were confined to a narrow strip of land a few miles wide lying along the shores of navigable waterways. But today the railroad is the artery that carries life in the form of industrial and commercial activity to wherever potential prosperity is to be found.

The first railroads to be built in Canada all ran east and west, but of late they have been pushing farther and farther north into Northern Quebec, Northern Ontario, Northern Manitoba, Northern Alberta and Northern British Columbia. In each case these roads are opening up new fields and planting industries upon newly discovered resources.

To take one example: the end of steel of the Temiskaming and Northern Ontario Railway which started but a few years ago from North Bay is now thirty miles north of Cochrane and within one hundred and forty miles of James Bay. In less than two more years one may leave Toronto or Montreal any evening and within thirty hours be bathing in the salt waters of this great inland sea.

## Two Large Pioneer Plants

At Iroquois Falls, this railroad has planted the Abitibi Power and Paper Co., already the largest individual pulp and paper mill in the world. Every morning except Monday a train of from twenty to twenty-five cars of newsprint leaves this mill and travels as a full newsprint train to North Bay where it is broken, part of it going west to Chicago and part continuing south to New York. The trip from Iroquois Falls, which is within two hundred miles of James Bay, to New York is made by freight in forty-eight hours.

A few miles west of Iroquois Falls the T. and N. O. Railway has opened up what is likely to become the greatest gold camp of the continent. It is only a few years old, yet its total production up to the end of 1922 was over one hundred and ten million dollars. The output for the year 1922 was about twenty millions of which one mine, the Hollinger, produced twelve millions which output makes it one of the largest gold mines in the world, if not, indeed, the largest.

About one hundred and seventy-four miles farther south the T. and N. O. Railway is responsible for the development of the Cobalt district, which up to the end of 1922 had produced over two hundred and fourteen million dollars in silver and cobalt. When

to these figures, is added the one hundred and seventy million dollars' worth of nickel and copper already produced by the mines in the neighbourhood of Copper Cliff, it will be seen that the mineral wealth already produced by New Ontario amounts to about five hundred million dollars.

The Hollinger Mines Ltd. and the Abitibi Power and Paper Co., Ltd., which are only two of the many industries that are already established in New Ontario, provide fine examples of the national value of successful men and at the same time indicate the magnificent opportunities in the most outlying areas of Canada that await those who will prepare to develop them by giving some attention to organizing their careers along the lines of self-study, intelligent and earnest work and reasonable economy.

Viewing the situation as it is from the **Garden City Press**, industries are but monuments to the work of successful men and women. Without men and women with the will and perseverance to study, work and save, there would be no progress. No matter how rich may be the material resources of a country they remain dormant until out of the intellectual resources emerge men and women with the foresight, energy and means necessary to their development.

## N. A. Timmins — a Pioneer

The town of Timmins, with its population of twelve thousand people and the roar of the stamp mills scattered round about that are busily engaged in pulverizing the ore for the concentration of the gold it contains, had its origin in the minds of a small group of men and owes its development to their direction and supervision. These men were the boys of but a few years ago, with no greater advantages than any boy of today possesses.

Mr. N. A. Timmins, after whom the town is named, is President of the Hollinger Mines Ltd., — the largest individual gold mine in the world. For the year ending December 31st, 1922, this company had a gross revenue of \$12,824,608.25, and a net profit of \$6,478,604.12. By the casual observer Mr. Timmins' great success might be credited to a streak of good luck. But this is not the case, as a review of his life's work will show.

Mr. Timmins was born in Mattawa, Ontario, which at the time was little more than a lumber camp. His father was a store keeper and lumber merchant. After a few years in the public school of his native town and four years at St. Mary's College, Montreal, he entered his father's business as clerk at the age of sixteen. Shortly afterwards he and his brother opened a branch of the business at North Bay, Ontario.

In studying the future possibilities of his business Mr. Timmins early began to realize that as the country around North Bay and Mattawa was not particularly suited to agriculture, once the timber was taken off, much of its future would depend upon the discovery of valuable mineral deposits, which then seemed



quite promising, due to the recent discovery of rich copper and nickel deposits at Bruce Mines and Copper Cliff.

All his spare time was spent in studying mining and all his spare cash in prospecting and in the development of promising discoveries. For fifteen years he continued to put money into the ground without getting anything out. But since this process was accompanied by intelligent observation and study, including a correspondence course, and attendance at instruction classes conducted by itinerant lecturers sent out from the School of Mines at Kingston under the supervision of Dr. W. L. Goodwin, then dean of that institution, Mr. Timmins was securing the best kind of education for a mining career, and one that was bound to bear fruit in time.

As a result, he was one of the first to appreciate the value of the initial discovery made at Cobalt, Ontario. He acquired a quarter interest in the LaRose mine, and directed the first shipments of ore made from that property. When the first two cars of ore were ready to go forward in the spring of 1904 the syndicate of which Mr. Timmins was a member had difficulty in negotiating a loan of five thousand dollars, required to pay wages and freight to the smelter.

But these two cars netted them forty-eight thousand dollars and laid the foundation of their financial independence.

When in 1911 Bennie Hollinger and John McMahon offered for sale the claim they had staked in the Porcupine District, Mr. Timmins was not slow to appreciate its value even at the price of nearly a quarter of a million dollars. He and his associates afterwards purchased several of the adjoining claims which go to make up the property owned by the Hollinger Mines Ltd.

Up to date this property has produced nearly sixty million dollars in gold, earned over twenty-eight million dollars of profits, and paid over eighteen million dollars in dividends.

The contribution which the successful career of Mr. Timmins has made to Canada through the part he has played in the development of her mineral resources provides another fine lesson that should not be overlooked. He has always been interested in mine development for its own sake, and much of the money made thereby has been used for further development. Neither in the days of his financial adversity nor when he was becoming financially independent did he try to gain an advantage by unloading a worthless mine on the public. He has stuck to sound and legitimate development and steered clear of wild-cat promotions. Gambling or fraudulent methods seldom finds a place in a successful career. They tend to pull down and dissipate those who have anything to do with them rather than build up and strengthen.

#### The Rise of F. H. Anson and Abitibi

In like manner the model town of Iroquois Falls and the adjoining communities of Little Canada and the Wye, with their four thousand inhabitants, as well as the mill and hydro-electric power plants of the Abitibi Power and Paper Co. Ltd., around which they have grown up, owe their existence to the foresight, intelligent direction and means of Mr. F. H. Anson founder and President of the above-mentioned company.

Mr. F. H. Anson came to Canada from the United

States in 1901 equipped with an education that included the study of law and engineering, with experience in railroading and with a thorough knowledge of the flour milling business. After nine years spent in perfecting the Ogilvie Flour Mills he sought a new outlet for his energy and ability. A thorough canvas of the industrial possibilities of Canada convinced him that the enormous resources of the Dominion in forests and waterpowers offered the opportunity he was looking for. His choice of the site at Iroquois Falls came about in a curious way.

As so many others have done, he agreed to grub stake two young prospectors who wished to look for silver in the region north of New Liskeard, which, at that time, was the end of the steel of the T. and N. O. Railway. After weeks of unsuccessful search, they were told of gold discoveries recently made in the vicinity of Lake Abitibi, so on they went. They were greatly impressed with the fine timber encountered in that north country and reported it to their benefactor as opportunity offered. Then followed data on Couchiching Falls and Iroquois Falls. Mr. Anson recognized this as the combination he was looking for and had surveys and cruises made, although there was no railway within a hundred miles of the place.

When the Transcontinental Railway was built and the T. and N. O. extended to meet it at Cochrane, Mr. Anson had accumulated sufficient means to make a start on the establishment of a pulp mill. As he began to build and finance his undertaking he found it possible to get sufficient capital to go the whole distance and constructed a well balanced pulp and paper mill on a large scale. The value of the present annual output of this mill is over ten million dollars.

Mr. Anson's own training, experience and habits have enabled him to organize effectively and to pick dependable men for responsible positions. His opinion is that education should fit a person for a job rather than for *some* job. This is exactly what "study in work" does as compared with "study in school."

#### The Great Clay Belt

From New Liskeard north to the shores of James Bay, the Temiskaming and Northern Ontario Railway traverses the great clay belt of Northern Ontario and Quebec. This belt contains over twenty-five million acres of potential farms where the able and willing worker can begin with little or no capital, make a home and gain financial independence in a comparatively short time, as many have already done. This belt will eventually be one of the important dairying and stock raising districts of the Dominion. Meadows and pastures in clay remain for years without reseeded. To homestead a bush farm requires little capital and provides work throughout the year—farming and clearing the land in the summer and lumbering and caring for live stock during the winter. It also provides much of the material required for buildings and fences.

Most people think of the country around James Bay in terms of icebound regions in the winter and muskeg in the summer, fit only for breeding grounds of wild fowl such as geese and ducks. This is far from being a true picture. The height of land or the breast-bone of the North American continent lies but a few miles north of Lake Superior, runs directly east to a point a few miles north of New Liskeard and then turns north-east and runs in a course parallel with the St. Lawrence River. From this high ridge where the



temperatures are necessarily extreme, the land with undulating topography slopes down for two hundred miles to the south end of James Bay where, by reason of the lower altitude and the modifying influences of that great inland sea, the temperatures are more moderate and crops less subject to frosts during the early autumn. From reliable accounts cereal and vegetable crops are less likely to damage from frost at Rupert House and Moose Factory than they are at New Liskeard or Cochrane, where thousands of successful farms are already well established.

This fine wooded watershed of land which lies like the rim of a saucer two hundred miles wide around the end of James Bay is traversed by a number of mighty rivers, notably the Albany, Moose, Harrieanaw, Nottaway, Rupert and Eastmain (the Missinaibi, Matagami, Abitibi and French are tributaries of the Moose). In two hundred miles these rivers drop from an altitude practically the same as is covered by the Mississippi in twelve hundred miles with the result that the product of erosion is carried to the mouth instead of being deposited en route resulting in floods and shifting courses to the river beds. These rivers have worn their courses to the bottom of the clay so that in places the river bed is from fifty to sixty feet below the surface of the surrounding country, thus making hydro-electric dams easy of construction. It is estimated that there are over two hundred excellent water powers in this area of which only six have already been developed.

#### A Picture of James Bay Area

With this general outline, let me present a picture of conditions as given to me a few weeks ago by the Ven. Archdeacon Woodall of Porquis Junction, Ont., who has lived with his family for fourteen years at Rupert House. During this time he visited practically all places along the shores of James Bay and made many excursions up the larger rivers for several hundred miles.

Rupert House is situated at the mouth of the Rupert River about three hundred miles farther north than Montreal and about eight hundred miles farther south than the Hudson Bay entrance to Baffin Straits. The tide at Rupert House averages about four feet. So shallow is the southern end of James Bay that the distance between the water line at low tide and high tide at many places is as much as seven miles. The bottom is clay and so hard that a man may walk anywhere without difficulty as he often has to do when his boat is stranded as the tide is going out. When dikes are thrown up, as they could be at little expense, much of this land will be easily put under cultivation. From the water line to the tree line there are several miles of prairie land where the grass grows luxuriantly. In places this prairie land is as much as twenty-five miles wide. Hay is annually cut in these meadows for the cattle kept at Rupert House. This shoal land in places is formed into islands that are never submerged. In order to save fencing, the young cattle at Rupert House are pastured on one of these islands. They are taken over just before the ice breaks up in the spring, which is generally towards the end of April and brought back after the ice has taken in the fall, which is towards the end of November or the forepart of December. When asked how he could live there for so many years without medical attendance, Archdeacon Woodall replied that it was something

they seldom had occasion to think about. They lived well on dairy products, vegetables and fish, led an active life in the open and seldom suffered from physical ills. He was inclined to attribute much of this healthy condition to a regular diet of fish. An excellent quality of fish is easily procured by staking nets when the tide is out and gathering the fish in pail fulls from the nets after the tide has risen and receded.

The picture which Archdeacon Woodall left with me was of a country which eventually would be very similar to the excellent and well tilled agricultural areas lying behind the dikes around the shores of the Zuyder Zee in Holland.

#### SOUTH AFRICAN ASBESTOS

The asbestos deposits of South Africa, the world's second largest producer, are described briefly in the "South African Mining and Engineering Journal" of February 3rd. The working mines are widely scattered throughout Cape Colony, the Transvaal and Southern Rhodesia. Blue asbestos, or crocidolite, comes chiefly from Cape Colony. It is brittle, but the fibre is long. A new variety, amosite, a ferrous amphibole, has been mined recently from deposits in the Transvaal. It has unusually long fibre, the length from one deposit averaging six inches, and is said to be useful for spinning. Chrysotile asbestos also is obtained in the Transvaal and Natal, a new and important district being now in operation at Kaapsche Hoop, near Barberton, where unusually long fibre, much of it over an inch in length, comprises quite ordinarily 30 to 40 percent of the rock quarried. The fibre occurs here in parallel seams, giving a ribbon structure. Another important Transvaal deposit is the New Gloria mine, near Messiva, which is compared with the quarries at Danville, Quebec.

The larger part of the South African asbestos, however, is derived from Southern Rhodesia. It occurs in widely separated districts, a number of which already have become important producers in spite of transportation difficulties. The Shabani and Mashaba districts are at present by far the most important producers, both in Rhodesia and in all South Africa.

The South African asbestos trade had a decided setback during the recent slump, but now it is improving gradually. The production during 1922 was valued at £80,230, against £103,067 in 1921 and £114,195 in 1920. It has thus a long way to go before it approaches in value the Canadian production. Transportation charges from South Africa to the chief centres where it is used will always militate against its use; but the gradual extension of the railways to the asbestos areas will make South Africa a competitor of growing importance with the Quebec field.

The value of the new aluminum produced in the United States in 1922, as reported by the Geological Survey, was \$13,622,000, an increase of about 25 per cent. over the value in 1921. During the first half of the year domestic aluminum was quoted at 20 cents a pound for 99 per cent. grade; in August the price was raised one-tenth of a cent a pound, and on the passage of the tariff act it was raised to 23 cents a pound, where it remained during the rest of the year.

The manufacture of Portland cement in the United States during January and February of this year exceeds the production in the corresponding months of 1922 by 84 and 83 percent, respectively.



# THE IRON ORE PROBLEM

BY WM. A. DOWLER

(The following is the fifth of a series of articles on iron ore by Wm. A. Dowler, K. C. one of the group of residents of Port Arthur, Ontario, who have studied the iron ore problem from various angles in an endeavour to make useful the great quantities of potential ore that lie tributary to their city. The first four articles dealt principally with the occurrence of iron ore in the adjoining part of the United States, and have been published in the "Financial Post." This fifth article is to appear in that paper also. — Ed.)

## What is the Iron Ore Situation in Ontario Today?

The answer is that, notwithstanding the fact that geological knowledge and deductions assure us of the presence of more iron-bearing rocks and a greater area of iron formation in Canada than in the United States, and that surface explorations have established conclusive proof thereof, nevertheless not a single ton of iron ore is being mined in Canada today and the whole iron and steel industry of Canada, and Canada's whole domestic and foreign trade in iron and steel deposits, rests upon about ten million dollars worth of foreign ore, imported chiefly from the United States, and upon many million dollars worth more of iron and steel imported from the same country. Moreover all increase of iron and steel production in Canada depends upon the same source for raw material, the market price of which to Canada is largely controlled by Canada's chief competitors in the manufactured products of such raw material.

**What is to be done about such an impossible situation? Shall we continue a policy of drift and the role of "Micawber?"**

With the exception of three serious attempts, at the Antikokan mine, at the Helen and Magpie Mines and at Moose Mountain, separated from each other by hundreds of miles, we Canadians have done little but drift.

## What is the result of this Policy?

During the last thirty years the Mesabe and Cuyuna ranges in Minnesota have come into being. Iron mining has become established on these ranges on such mammoth foundations of plant, equipment and organization; the transportation of the ore from the mine to the boat has become so well organized and such effective equipment has been provided therefor; such extensive and far-reaching organizations have grown up, entrenched behind interlocking directorates and affiliations that so dominate the supply, price and distribution of the ore mined; that a very imposing wall has been built up during these thirty years against any beginners in the iron ore business in Canada.

Again the business of Canadian furnaces has been so founded on certain United States grades and blends of ore that a beginner in Canadian ore would find poor encouragement in the limited Canadian market. On such a small share of the Canadian consumption as he could hope to secure he could not begin to install the mining equipment or organization

that would enable him to compete as to mining cost with the Minnesota mine, and would enable him to ship at a competitive cost of transportation, since on shipments for the Canadian Market alone the transportation companies would not care to afford facilities and rates corresponding with those in the United States.

Suppose, for instance, an individual or group of individuals spent the time, effort and money to demonstrate the existence of a shipping quantity of Canadian ore in one deposit and sought to secure a purchaser or to interest capital to mine and move that ore. The two questions of mining cost and cost of transportation face him. Suppose he asks the railroads to furnish him with a rate and facilities corresponding to those that can be secured at Duluth and Superior. The Canadian railroads have no such facilities — the facilities at Duluth and Superior cost millions. How can the railroads be expected to furnish such facilities without an assurance of continued tonnage on a scale to furnish long-continued revenue? How can this assurance be given on the basis of ore to be shipped to the limited Canadian market which may be available?

If, during the last thirty years, such conditions have become established and now constitute hills of difficulty against a present attempt to create a Canadian supply, will another period of years of inaction and indifference lessen these hills of difficulty — will not the number and height of the hills on the contrary increase?

And these are not the only hills of difficulty.

If one ventures to mention the subject of iron ore he is told Canada has none worth while, that the United States Steel spent millions in trying to find ore and gave it up as a failure; and this statement, together with some disappointments that have been met by others is regarded as setting the question for all time. In fact, so completely has this motion taken hold of everybody that it has become a sort of settled creed amongst the United States interests, the Canadian furnace people, Canadian business men and Canadians generally, that Canada has not ore worth while.

## Wherein lies the justification for this organized pessimism?

The United States did not open up any of the Minnesota ranges, neither did any of the big interests. Both the United States Steel and Pickands, Mather & Company went into the Cuyuna range and spent large sums and abandoned the field, and yet the Cuyuna range has proved its value and is a heavier shipper today than the original Vermillion range and is likely to continue to be such, even though the ore has to be explored for at great depths, with no surface indication to guide the explorer.

As an illustration of why no person has a license to make or believe the statement that we have no merchantable ore, take the course followed with a single forty acres on the Mesabe Range. If the driller in putting down five or six holes across the forty acres strikes an underground deposit of taconite or iron



formation, not ore, he immediately proceeds to cross-section the whole forty acres with holes comparatively close together, to find if possible a deposit of ore in the body of taconite discovered. This is intensive prospecting, such as has never yet been conducted on the Canadian ranges.

There is a known range of iron formation along the Port Arthur and Duluth Railway in this district, from Gunflint to the Mattawan River, a distance of over sixty miles and not a drill hole has been put down on it except a few in the neighborhood of Mokenin near the Mattawan where the formation is much folded and disturbed. Has any one license to say or believe there are no mines in this range of sixty miles because shipping ore was not found as a result of a few holes in the extreme end? This range is only one of a half-dozen or more in the Western and Northern part of Ontario, to say nothing of other parts of Canada.

**How are these hills of difficulty to be overcome and the present situation changed for the better?** By affording some special incentive to initiative and enterprise in the utilization of our deposits and the proper exploration of our ranges, and by affording some inducement to Canadian Furnaces to experiment with and use Canadian ore, their commercial use will be assured.

Two large investments, at the Helen and Magpie mines and at Moose Mountain, are lying idle because the concentrated products have not a profitable assured market at present cost of production in their present form. Were it possible by some incentive to start these ores moving in large quantities the momentum would keep them moving thereafter.

Some incentive which would operate as a differential to meet the cost of treating the sulphur in the Atikokan ore and the extra cost of handling at the water front would put that idle mine and the Atikokan furnace into operation.

A sufficient incentive would attract enterprise and capital to the beneficiation of the extensive bodies of low-grade ore, magnetite, hematite and siderite, which are exposed in different places, and which are as high and in some cases higher in iron content than are being utilized elsewhere on this continent and generally in Europe.

But more important and far-reaching still, and probably more certainly, a sufficient incentive would at the present time surely attract men with the initiative, enterprise, courage, persistence and money to carry on proper intensive exploration of the known iron ranges we possess, and to discover others. Just as surface exploration and the discovery of surface outcroppings in many places and over large areas have proved the correctness of geological deductions as to the existence of many large areas of iron formation, the underground exploration of these areas is sure to disclose the assembling at numerous points in these iron formations, of the iron oxides in such concentrated form as to constitute ore-bodies of shipping quality.

**Where should these incentives and inducements come from?**

They should be provided by the Province in the first place, which will ultimately reap the benefit from the added wealth of those parts of the province in which the industry is established. They should be provided by the Dominion in the second place, which will derive the advantage of the increased industry and trade, built on the solid foundation of our own natural resources.

**Whence should additional encouragement come?**

It should come from the iron and steel industry of Canada and the business and transportation interests generally.

**In what form should such latter encouragement come?**

It should come in a readiness on the part of the iron and steel industry and business interests to weigh and consider evidence submitted and on reasonable evidence make reasonable bets on the discovery of shipping ore and on the utilisation by beneficiation of leaner deposits. There should be also readiness on the part of transportation interests to anticipate somewhat the possibilities of ore development in given localities, and on probabilities based on reasonable grounds to anticipate shipping requirements, and to consider and establish rates to encourage the development of traffic in iron ore?

Provincial and federal incentive measures should manifestly be of a general character such as is available to induce and secure all the different activities aimed at and should be based on results, and thus cost nothing unless results are obtained. The offer might remain open for a limited period only and likewise might extend only during a limited period.

The provincial measure should be of a type that will appeal to and attract the activities of the prospector, the developer, and the man with money who can afford to acquire and is willing to take the risk on prospects that appeal to him as suitable to market and transportation conditions.

Such prospectors, developers and men willing to take such risks opened up the Minnesota ranges. We have been waiting for them to do the same with the Ontario ranges; but we have not had, nor have we now, the same drawing conditions, and thirty years of waiting since the first Mesabe shipment finds us farther away than ever by reason of the equipments, facilities and channels of trade being established and entrenched in other quarters.

Should the special incentive, inducement and encouragement indicated be provided, the attention of prospectors, developers and men who can and will take the risks will be secured; the intensive exploration of our ranges will be undertaken; shipping mines of high-grade ore will be opened up, and beneficiating plants will be put into operation; and the situation deplored at the outset of this article will be changed and our heritage of iron ore in the pre-Cambrian area be made to yield up its treasures. Thus will Canada come into her own as an iron ore producer.

Will we Canadians fail to meet the needs of the situation? Surely not.

## RESEARCHES ON COAL

Fine coal dust and moist air quickly increase the hazards of spontaneous combustion, according to Bulletin No. 3, reporting recent coal-mining investigations, and issued by Carnegie Institute of Technology, at Pittsburgh. Another conclusion set forth in the report is that the mixing of fresh coal and old coal does not develop any more heat than that due to the coals themselves when piled separately.

This bulletin is one of a series of four that are now available for distribution, giving in full the findings of research work conducted under the joint auspices of the Carnegie Institute of Technology, the U. S. Bureau of Mines, and an Advisory Board of coal mine operators and engineers. Carnegie Tech employed four Research Fellows for the work, the Pittsburgh



Experimental Station of the U. S. Bureau of Mines provided supervision; and the Advisory Board, which selected the problems, also provided the funds to publish the bulletins. Their issuance marks the first milestone in the serious efforts of the coal mining industry to stabilize the mining business in co-operation with an educational institution.

That most of the alloys available for use in coal mine equipment are corroded extensively by the acid waters in mines was one of the results of tests described in Bulletin No. 4. The corrosion tests on metals and alloys in acid mine water from coal mines were undertaken at the suggestion of an Advisory Board of coal operators with a view of obtaining information as to the acid resisting properties of the various metals and alloys available for use in underground equipment exposed to the corrosive action of acid mine waters.

According to the report, brasses, which contain considerable zinc were corroded rapidly; bronzes containing considerable tin were also corroded, but to a less extent than the brasses; cupro-nickel and nickel-silver alloys were corroded about to the same extent as the brasses. Alloys that were practically unattacked by the acid mine waters include a high chromium steel, two highly alloyed chromium-nickel-silicon steels, a nickel-chromium-iron alloy, and a high-silicon cast iron. These resistant materials possess certain disadvantages for general use in coal mine equipment, such as the brittleness and hardness of the high-silicon cast iron and the relatively high cost of the others. However, these resistant materials should prove satisfactory for use in such pump parts and other equipment where these factors are not a serious consideration.

Thick Freeport coal when carbonized at temperatures around 600 deg. C. will yield 25 to 30 gallons of tar, 8,000 cubic feet of gas, and about 1,380 pounds of low-volatile coke per ton, according to Bulletin No. 1. This conclusion was derived from tests made in a study of "the yield and quality of the gas, oil, and other by-products of the constituents of the Freeport Coal Bed, Pennsylvania." The problem was undertaken at the suggestion of an Advisory Board of coal-mine operators and engineers and conducted under the joint auspices of the Carnegie Tech. Mining Department and the U. S. Bureau of Mines.

Other conclusions set forth in the Bulletin are:

"Bone coal is worth about half as much as the true coal — that is, from the standpoint of gas and oil yields. The distillation residue is not a coke and is of small value, but perhaps could be utilized for special purposes."

"The cannel coal tar is worth perhaps more than the tar from the true coal, and the gas is better, though the yield is only about half that of the true coal. The residue is non-fused, different from that of the bone coal, and lower in ash content."

"Bone coals and cannel coals yield about half as much ammonium sulphate as the true coals."

"Considering the value of thick Freeport coal as a high-temperature by-product or gas coal, it probably would not pay under prevailing economic conditions to carbonise it at low temperature."

A marked variation in the structure of the Freeport coal from the bottom to the top of the bed was found in "a microscopic study of the Freeport Coal Bed, Pennsylvania", according to the report contained in Bulletin No. 2.

According to Reinhardt Thiessen, Research Chemist, U. S. Bureau of Mines, and Anson W. Voorhees, Research Fellow, Carnegie Institute of Technology, the authors of the report, the individual benches of the Freeport bed also vary in composition from bottom to top. At the top of the upper bench is found a coal composed almost entirely of spore-exine-rich attritus, and containing much humic but very little anthraxylon. This concentration of spore and pollen exines, cuticles, and humic matter is so pronounced that in some of the sections this portion of the coal resembles a cannel, and differs from it chiefly in its much more pronounced bedding.

The thick Freeport coal bed was sampled at five mines, suitably situated in the area under consideration. Photomicrographs were made at regular intervals from the bottom to the top of the bed, including the bone and cannel constituents, and a number of the typical photomicrographs are reproduced in this report.

Copies of any of these four reports may be obtained from Edward Steidle, Supervisor, Cooperative Mining Courses, Carnegie Institute of Technology, Pittsburgh.

## COAL SITUATION HOPEFUL

by John Moffatt

Coal is King today, Coal has the floor—and who will put him off? Senator J. S. McLellan, whose early life was spent at the Cape Breton Collieries, rising from one position to another until he became a director of the Dominion Coal Company, in a very carefully prepared and able speech, expounded to the Senate the necessity of making Canadian coal, if possible, bridge the wide gap left by nature in her distribution of the coal fields in Canada. A committee was at once appointed to make inquiry into coal conditions. The House of Commons followed along similar lines, and we can hope that the more extensive use of Canadian coal fields is foreshadowed by the work of these august bodies.

Sir Henry Thornton, in giving evidence before the Senate Fuel Committee stated that the railway rates on coal could be lowered to enable Alberta coal, which is now coming as far East as Winnipeg, to compete with American coal still further east. Nova Scotia coal could at low rates be carried further west than is now being done. Whether Canadian coal can cover the whole territory between the mines of Alberta and Nova Scotia is problematical, and whether Canada can become wholly independent of American coal is doubtful. But with low rates and the changes about to take place, such as the making of coke in the larger Canadian cities and the saving of the by-products, we are evidently on the eve of a new Coal Age in this country. Canada has no great known fields of anthracite, but substitutes can be made. The anthracite coal areas of the United States are being rapidly exhausted, and while for years to come they may maintain an output of 85 or 90 million tons, yet the price will continue to increase as the more accessible areas become depleted, and may reach a figure which Canadians will refuse to pay.

A Scottish professor speaking before one of the Mining Institutes of that country, recently made the



statement that the time is not far off when very little coal in its raw state will be used for domestic purposes, that the by-products of all coal will be extracted and a great waste of fuel now going on will cease.

Professor Deon of Glasgow University, speaking before the students of that city a short time ago on coal research, stated that methods for the production of smokeless fuels had during recent years been the subject of much experimental work in Glasgow and elsewhere. He believed that the corporation of Glasgow now contemplated a great practical advance in this direction—an advance that might mean that in a few years the City of Glasgow would enjoy as pure an atmosphere as was experienced during the unfortunate strike of 1921. He further stated that science was busy with coals that were non-coking and that a process would no doubt be discovered by which they could be made into coke.

President Roy Wolvin, in his report to the directors of the British Empire Steel Corporation the other day, stated that the manufacture of coke for household use is under consideration by his company. This is along the right lines, being both a conservation of fuel, and a substitution of native for imported coal. When the yearly output of the Nova Scotia reaches the 10,000,000 tons set by Mr. F. W. Gray as a maximum, it may by new processes as yet undiscovered have the efficiency of double that quantity.

The inferior coals, such as the lignites, stand to gain much by the changes that follow the extensive experimental work being made on this continent. Thus the value of a grade of fuel now avoided wherever possible will be gladly enhanced, and its uses will become more general.

Economical use, by increasing the efficiency, will go a long way in solving the fuel problem of this and other countries.

## A NEW METHOD OF MEASURING THE FLOW WATER\*

By NORMAN R. GIBSON \*\*

About the end of the first century, Hero of Alexandria first described the volumetric, or bulk, method of measuring the flow of water. He pointed out that it was not necessary to measure the area of the orifice through which the water was flowing but that a pit might be dug and the water allowed to flow into it for an hour by the sun dial, and the volume of the pit filled in that time determined. This method, refined by the use of instruments of precision, remains today the standard.

During the past three years, an entirely new method has been invented by the author, using three fundamental principals developed within the last 250 years; that force is equal to the product of the mass and acceleration of bodies; that the momentary change of pressure in an enclosed column of water is equal to a "constant" multiplied by the momentary change in velocity, when due allowance is made for the compressibility of water and the elasticity of pipe walls, and when the speed of propagation of pressure waves in water is taken into consideration; and that spouting velocity of water is equal to the square-root of the head or fall under which the water is discharged, multiplied by the square-root of twice the gravitational unit.

Velocity heads and friction losses are proportional to the square of the velocity.

Two essential conditions for the new method are: First, the water must flow through a pressure pipe or other closed conduit, and, second, means must be available for controlling the flow, such as a valve or the gates of a turbine at the end of the conduit. In a typical hydro-electric power plant these conditions are fulfilled when water flows out of a forebay into a penstock at the lower end of which is a turbine and generator equipped with hydraulic governor to operate the turbine gates. The new method is particularly applicable to measurement of water for testing efficiencies of hydraulic turbines in hydro-electric power plants.

The principal operation is to obtain a record of the changes of pressure that occur in the conduit when the water therein is brought to rest. Steady conditions of load on the turbine are maintained for several minutes until the flow has become as uniform as possible. When the usual observations of head, power, etc., have been made, the turbine gates are gradually and gently closed so as to shut off the supply of water to the turbine. Immediately preceding and during the closure of the gates and for a short time afterward, there is obtained a record of time intervals and of the changes of pressure that occur in the conduit. This record is obtained by means of the Gibson Apparatus which is connected through the wall of the conduit by a 1-4-inch piezometer opening at any convenient point upstream from the turbine casing. After the closure, when the disturbance in the penstock has subsided, the same apparatus is used to record the static pressure then existing in the conduit. The complete record is called the pressure-time diagram and when properly interpreted is a precise measure of the mean velocity of the water in the conduit at the moment the gates began to close.

In addition to usual equipment for efficiency tests there is required the apparatus for obtaining pressure-time diagrams. It combines mercury U-tube gage, pendulum, camera box, photographic lens and motor-driven revolving drum enclosed in a light-proof cylinder. The U-tube is made with a short leg of glass tubing and a riser of steel tubing, the ratio of the areas of the two legs being such as to limit within the length of the glass tube the displacement of the mercury under changes of pressure. Calibration of this ratio is readily made.

The making of a pressure-time diagram is simple, each diagram being made on a photographic film 11-inches wide by 18-inches long, from which blue-prints are obtained. On the blue-prints lines are delineated, first to determine the end of the diagram, which is readily accomplished by reference to the uniform periodicity of the pressure oscillations which occur after closure of the gates, and, second, to eliminate from the diagram that portion of its area which has been created simply by the recovery of the combined friction and velocity heads of the water flowing in the conduit. The remained of the area is then used as a measure of the mean velocity in the conduit. In this method only the flow actually shut off is measured. Usually the turbine gates are not perfectly tight. This leakage is readily determined and added to the discharge calculated from the diagram.

Measurements at the hydraulic laboratory of Cornell University, in 1920, showed the mean variation from volumetric measurement was less than 0.2 of one per cent, and the maximum variation of any one measurement was 1.6 per cent. Advantages, in addition to accuracy, are brief interruption in operation of power plant, and low cost.

The North Western Railway of India has laid 50 miles of track with a new iron and concrete sleeper, the "Stent sleeper", which is fitted with plugs of creosoted wood to which the rails are attached.

\*Research Narrative No. 53, Engineering Foundation.

\*\*Hydraulic Engineer, Niagara Falls, N. Y.



# The Mining Districts

BY THE JOURNAL'S CORRESPONDENTS

## NORTHERN ONTARIO

**COBALT.**—The new shaft of the Colonial is now down slightly over 900 feet, and the contact should shortly be reached. It is proposed to crosscut to the vein, close to the contact, and after drifting for a short distance in the underlying Keewatin, to run an incline raise at an angle of 45 degrees in order to thoroughly prospect both formations.

The Coniagas is meeting with very good results in the development of the Beaver, and several high-grade shoots have recently been opened up. It is understood that the company is negotiating for the purchase of the property from the Beaver Company rather than continue operating under lease, as is being done at present. Under the agreement the Beaver Company gets one-half the profits. The mine has not yet been fully unwatered, and work has not been started at the lower levels, where interesting developments are expected.

During the month of February the Mining Corporation treated 8,481 tons, and produced 71,439 ounces. The costs at the mine were \$47,620, which does not indicate a profit to the company. Very favorable results, however, are being met with in the operation of the Frontier property in South Lorrain, which is operated by a subsidiary of the Mining Corporation. The first real stoping has been started and the new shoot on the Woods vein has been opened for a length of 90 feet, and shows from 5 to 30 inches in width of high grade ore, running 3,000 to 8,000 ounces per ton. It is understood that 1,000,000 ounces has been produced from drifts alone. In order to provide additional tonnage for the mill at Cobalt, the company has an option on the Kerr Lake dump, and is now sampling it. This dump is estimated to contain 75,000 tons.

During the month of February three Cobalt companies shipped 174 tons of ore and concentrates, and the Keeley Mine in South Lorrain shipped 41 tons, making a total of 215 tons, all of which went to the Deloro Smelting & Refining Company. The Cobalt companies shipping were the O'Brien, with 97 tons, McKinley with 44 tons and Larose with 33 tons.

**EXTENSIVE DIAMOND DRILLING.**—Diamond drilling is being used to a greater extent than ever throughout the various mining districts of Northern Ontario, and it is stated that there is a total of 40 drills at work. Most of these are being used in the Porcupine district, where the three big producing mines, Hollinger, Dome and McIntyre, are working 11 drills. The paymaster is also running several drills, and an outfit has recently been started on the Moyer-Bremner property, which as lately been optioned to La Rose. In the new Rouyn gold district of Quebec, 4 machines are already at work, and it is expected that the results of this drilling will have an important bearing on the development and exploration work that will be undertaken there this summer. Several machines are being used in Kirkland and the surrounding district. The Norando Company will shortly begin drilling on its claim in Gauthier township, west of the Northland.

**KIRKLAND.**—On the 900-foot level of the Kirkland Lake Gold, the new ore-body recently developed on the 700, 800 and 1000-foot levels has been intercepted, and the values are understood to be high. It was recently reported that American interests were negotiating for the control of this property, but nothing definite has developed.

At the annual meeting of the shareholders of the Argonaut Gold Mines Limited, in Montreal, the by-laws authorizing the directors to increase the capital from \$3,000,000 to \$4,000,000 were passed. The new stock will not be issued to the public, and will be used to pay off the company's obligations and to acquire additional properties.

**SHINING TREE.**—The Tonopah Mining Company of Nevada has stopped work on the Herriek mine in West Shiningtree. The Tonopah Company has had an option on the Herriek for a considerable length of time, and in addition to deepening the shaft did a large amount of drifting. Values of about \$5.00 a ton were found over comparatively narrow widths, which is not enough to hold out much encouragement in that section, where transportation facilities are poor.

**PORCUPINE.**—The 31st of March will be the end of the Dome fiscal year, and will mark a new step forward in the history of that company. Official figures are not yet available, but it is understood the production will amount to \$4,600,000, an increase of \$1,800,000 over the preceding year, while profits are expected to be \$5.50 a share as compared with \$2.50. The cash surplus over liabilities is approximately \$3,500,000, and broken ore reserves 400,000 tons as compared with 275,000 tons. During the last month or two the tonnage treated has been curtailed on account of the power shortage, but mill heads are reported to be the highest in the history of the company.

**POWER SUIT.**—The suit of the Northern Canada Power Company against the Hollinger is now being heard in the Supreme Court of Ontario. The action arises out of the fact that the Northern Canada Power Company has never had a hard and fast power contract with the Hollinger, and is asking for specific performance in the execution of a contract which it is alleged the Hollinger agreed to sign in November, 1912. The Hollinger entered into a written agreement to sign a contract, but the contract itself has never been completed. The Power Company asks that the Hollinger be required to sign this contract, which calls for the full power requirements for the life of the mine. The Hollinger claims that the Power Company is unable to live up to its side of the agreement, and in support of this points to the fact that the mine is now receiving only 3200 h.p., as against 10,000 h.p. which is necessary to carry on operations at the capacity of the present plant. The mine also proposes to increase the output to 8000 tons per day, which will call for considerably over 10,000 h.p. The Power Company takes the stand that it will make provision to supply the mine if it receives reasonable notice of any prospective increase in consumption. The company states that since 1920 it has received no official or



formal notification of the Hollinger's intentions to increase its operations and power consumption, and also brings out the fact that in 1915 Mr. Percy Robbins, the previous Hollinger manager, wrote the Power Company stating that the Hollinger intended to make enlargements which would call for 6500 h.p. within two years, and that although the Power Company made the necessary enlargements to meet this increased demand that it was not until five years later, in 1920, that the mine was able to use this amount of power.

### NOVA SCOTIA

**THE STEEL WORKERS' UNION.**—The week has been one of sensations, and the workers of the Sydney steel and allied industries had sufficient to stir them up and set them thinking seriously. In an open letter replying to the manifesto of President Roy Wolvin, who outlined the policy of the Steel Company as "the open shop, no recognition of the union, no check off, but an increase of pay to the workmen when the industry could afford it," the officers of the Steel Workers' Union uttered their defi. The tone is arrogant and insolent, the language boastful and threatening. The demand for a fifteen percent increase was cancelled and one for thirty percent substituted. The eight-hour day, the check off and recognition of the Union if not granted, are to be forced. There is no attempt made to hide the "rule or ruin" policy of the Steel Workers' Union.

The press reports state that only one hundred and fifty members were present when this resolution was drawn up, and some people seemed to take comfort out of the fact that the members were few, seeing the total of the workmen employed is about three thousand. Small meetings, however, do not always indicate that the majority will not obey a strike order when it is sent out. A strike is very contagious and the feeling runs like wildfire. The Steel Company seem to realize this and have set their house in order. They have reduced their authorized capital from \$500,000,000 to \$250,00,00 and have captured public confidence. They have taken care to inform the public of the unprofitable state of the steel trade during the year just ended. They have also made it known that prospects are much brighter, and with increased profits the wages of the workmen would be put up. They have likewise given their view of the attitude and actions of District No. 26, United Mine Workers, in Nova Scotia.

**R. M. WOLVIN'S REPORT.**—President Wolvin, in his very able report to his directors and shareholders, shows that both the coal and steel industries of Cape Breton are being much hampered by paid agitators, with no other desire than to wreck the industry. He points out that the check off system had provided funds to put into operation revolutionary propaganda. The responsible officers of the Union, after signing agreements on behalf of their members, publicly declared that the contract signed by them was not binding, on their part, but only binding on the Company. The U. M. W. officials in their official newspaper and on public platforms in Nova Scotia and elsewhere openly justify the destruction of the Company's property by strikers. President Wolvin further stated that "we have reason to believe that money collected by us, for the United Mine Workers through our offices, is being used as the main support for most dangerous newspaper propaganda, not only aimed at the Com-

pany, but for the avowed purpose of overturning established government in Canada."

**A DANGEROUS SITUATION.**—The storm centre for this agitation has shifted to Cape Breton and has reached an acute stage, demanding consideration by all thoughtful and responsible citizens. The movement is apparently more political than economic in its objects, and is causing alarm to all who are interested in the industrial development of Nova Scotia, and therefore demands very serious consideration by the Government authorities both at Halifax and Ottawa.

President Wolvin is right in his statements. The district officers of No. 26, against the wishes of the international executive with headquarters in the United States, are using their funds in an attempt to destroy the industrial system of Canada, especially the steel and coal industries of Cape Breton. Should the Steel Company reach the stage where they will be forced to refuse to collect the check off for the miners, they will be fully justified in that action, and may not be greatly blamed by International Headquarters. Indeed the district has already been accused from this quarter of taking money given to them by the International Treasurer for the purpose of helping them during the late coal strike and saying nothing about it, while at the same time their own funds were used to finance a newspaper openly advocating the destruction of their own international organization. The check off is usually granted on the understanding that the labor organization is a responsible body and as such will loyally fulfil all agreements. If agreements are repudiated by the labor leaders, as is now being done, and business left at the mercy of every new agitator or aspirant for office, why make contracts or give the check off? Why not settle the whole question and be done with it? And while settling it, if it is found that some districts of Nova Scotia are willing to keep their agreements, why not continue to do business with these in the old way? There are many good, right-thinking miners in Nova Scotia who are not in sympathy with the disloyal, unpatriotic Bolshevik propaganda now carried on. They prefer to be true to their agreements, and to the instructions of the international organization they have joined, and if it comes to having to choose between the officers of District No. 26 and President J. L. Lewis and his Executive, they will follow the latter.

**A REBELLION AGAINST TYRANNY.**—Already the locals of Cumberland and Pictou counties have objected to the red Russian methods of their officers and have refused to pay per capita dues to the district. They have advised international headquarters of their action and the cause. If a section of the workmen are so staggered by the extreme action and advice of their own leaders that they revolt, why should the British Empire Steel Corporation not make their protest to the international executive as well as to the Canadian public? Objection might be raised that Canadian industry should not be forced to appeal to American labor organizations against Canadian workmen. But both parties have long ago recognized the American union. The constitution was taken as a basis of recognition of the union and when the principles on which it is found are subverted by a district in Canada, surely the proper thing to do is to appeal to the executive. There justice and fidelity to agreements will be found.

Of course this has to do with the mining only; but the disturbance among the steel workers has been



fermented by leaders of the miners and the lawless turbulent spirit created at the collieries and seen in the late strike at Sydney may again be witnessed if it is possible to bring on another strike. Let us hope that wisdom may prevail at a time when the prospect for a good year so much needed is growing brighter.

### BRITISH COLUMBIA

**PORTLAND CANAL.**—The "Outsider" group of claims, situated at Maple Bay, Portland Canal, British Columbia, which has been acquired by the Granby Consolidated Mining & Smelting Co. and is to be further developed and equipped with surface and underground plant next summer, is not a new property. It was staked years ago and the work of exposing and blocking out the ore, as well as the provision of facilities for mining and shipping it, were far advanced long before the Granby company became interested. For this reason it is not surprising to learn that H. S. Munroe, general manager of the Granby, estimates that there are between 30,000 and 40,000 tons of ore in sight and proven and that, with the construction of adequate docking accommodation, the installation of an aerial tramway, and other such preliminaries, it will be possible to undertake shipments to the Anyox Smelter. Such shipments, it may be stated incidentally, are expected to commence before the end of the year.

There are fourteen claims, including fractions, in the property. Up to the year 1906 a quartz vein had been traced through seven claims running diagonally up the hillside at an angle of 30 to 40 degrees. The principal work was done at the junction of what is known as the "Regina" and "Copper King" claims. At an elevation of 1,100 feet, and 6,000 feet back from the Bay, a main tunnel was run in 300 feet on a well-defined quartz vein, which follows the strike and dip of the schistose country rock, the dip being about 60 degrees to the east. The vein, while clearly defined, swells and contracts in places, varying from five to fourteen feet wide and is well mineralized with copper pyrites, the ore averaging 3 per cent. copper. A second tunnel was driven at an elevation of 75 feet above the first and at that time was in on the vein 100 feet. Twenty feet higher still another tunnel was driven on the vein for 40 feet. No stoping had been done but the different levels were connected preparatory to stoping and the ore that was taken out was handled through the lower or main tunnel.

On the surface above the upper tunnel the vein was stripped and showed up strongly, crossing over a shoulder of the mountain. Two or three small diabase dykes were cross-cut in the tunnels and also show up on the surface. They cross the veins from wall to wall but do not run into the country rock. On a level with the upper tunnel, but some 550 feet to the north, is a small gulch. A cross-cut has been driven through the schist country rock to cut the vein. At this point the vein was found to be about three feet wide and not as heavily mineralized as in the main working. From the inner end of this cross-cut tunnel a drift was run to the north on the vein for 150 feet, while a drift to the south, towards the main workings, was run for 220 feet. In the south drift at 140 feet from the tunnel the vein has been replaced by a diabase dyke, but towards the inner end of the drift the vein comes in again with a width of eight feet, throughout which width it is well mineralized with copper pyrites. The vein has been traced for a considerable distance, both above and below the main

workings, and there is every promise of a large body of ore.

The Brown Alaska Company, whose headquarters were at Seattle, Wn., and who had a smelter at Hadley, Alaska, were the original operators. The plant installed by this company included an aerial tramway running 6,000 feet from a point just below the main tunnel to ore bunkers at Maple Bay, where loading facilities were provided. A 6-drill Rand compressor was installed at the beach and a pipe line laid to the mine.

The mining camp of Alice Arm, which is the tide-water outlet of numerous claims and prospects, as well as some properties already showing signs of being mines in embryo, most of which are scattered along or close to either Kitsault or the Illiance river, looks forward to rejuvenation next summer. The Esperanza is expected to continue shipping as well as development and is likely to be joined by the Lone Maid. Both are in the Kitsault section. The Horse Shoe and the Homestake, near the Kitsault Glacier, are to be further developed. As to operations on the Dolly Varden, little is known. The bunkers, railway, and mine plant, however, are deteriorating by reason of disuse and as many thousands of dollars are tied up in this equipment it is thought that action of some kind must be taken this year. The country back of Alice Arm is highly mineralized. It has long been a favorite stamping ground for the prospector and there is no doubt that it will see much activity this year.

Reports of progress on the property of the B. C. Silver Mines, Ltd., near the Premier Mine, Salmon River, continue to reach the Coast. It is said that the vein recently cut by a tunnel at a depth of 400 feet has proven to be 40 feet wide, with satisfactory gold and silver values. A drift now is being driven on the lead and the work is being continued over the full twenty-four hours every day. A large oil-driven compressor and a steel sharpener are being installed. This machinery, together with a large quantity of food and supplies, are being taken in over the snow.

**AINSWORTH.**—The Florence Mine, Ainsworth B. C., is likely to be taken over by a new syndicate. A group of Detroit bankers and manufacturers, headed by D. L. Robinson, propose to purchase the property, and to furnish up to \$600,000 for improvements and to increase production, if the present shareholders agree to the terms offered. A meeting of the latter will be held at the mine on April 4th to discuss the matter.

The syndicate will either take over the old company and increase the capital stock 1,750,000 preferred and 2,000,000 in common shares, or will organize a new company. It will receive 500,000 of preferred for the \$450,000 advanced for improvement. The sum of \$3.20 a ton on all ore mined will go into a sinking fund to retire the preferred stock. This does not include interest on the purchase, which must be paid separately. If there is no profit in the ore, interest must be met from other sources. Whatever profit accrues over \$3.20 a ton must be used for the further development of the mine or the call of the preferred stock at \$1.25 a share. The management remains with the present board and the stockholders until all the preferred stock is retired. The holders of present stock will receive an exchange for their stock share for share.

The \$450,000 referred to, it is explained, will be expended as follows: \$150,000 to retire present liabilities; \$175,000 for electric power plants; \$50,000 to enlarge mill to 350 tons; \$10,000 for additional mine equipment; and \$60,000 for mine development.

The consideration for the transfer of the property is \$1,250,000, to be paid from the production of the



mine, the basis of payment being \$1 a share and interest at 10 per cent if made from production, or \$1.25 and interest if the stock is called for before the production is completed.

E. R. Wolfe, president of the Company, makes the following statement:

"Production with the present equipment can pay for the mine in four years, but with the improved equipment, to be provided from the \$50,000, I believe it will be paid in three years. In the meantime the stock will draw interest at par, \$1 a share, beginning April 4. The \$3.20 per ton payments are based on ore to be mined, not milled. The net value of the mine ore is \$12 a ton. The consulting engineer for the purchasers, Frederick G. Lasier, who has operated mines in Colorado and Mexico, found 250,000 tons of ore in sight and 225,000 tons of probable ore. This is more than enough to pay for the preferred stock. Mr. Lasier's figures do not include extensions of known ore-shoots, which undoubtedly will be developed at great depths by advance of the Nos. 2 and 5 tunnels. These tunnels will attain depths of 1000 and 1350 feet, respectively, on the next known ore-shoot."

Ore receipts at the Trail Smelter, Consolidated Mining & Smelting Co., for the week ending March 14th totalled 8189 tons. There were two new shippers, the Galena Farm Mine, Silverton, and Fred. Bowden, of Chopaka in the Similkameen.

The shipments in detail follow:

| Mine                          | Tons |
|-------------------------------|------|
| Black Rock, Northport,        | 72   |
| Company Mines                 | 6923 |
| Fred Bowden, Chopaka          | 12   |
| Galena Farm, Silverton        | 29   |
| Henderson Gp. Smithers        | 27   |
| Knob Hill, Republic Wn.       | 159  |
| Krao, Ainsworth               | 18   |
| Lone Pine, Republic Wn.       | 108  |
| Paradise, Invermere           | 43   |
| Rosebery Surprise, New Denver | 141  |
| Silversmith, Sandon           | 383  |
| Standard, Silverton           | 145  |
| Surprise, Republic Wn.        | 104  |
| White Water, Retallack        | 35   |
|                               | 8189 |

## AN IRON AND STEEL PLANT FOR BRITISH COLUMBIA

### A Spokane Engineer Discusses the Problem

In discussing the general question of the supply of iron ore for this continent, "Iron Ore," Ispheming, Mich., in a recent issue quotes Chester T. Kennan, of Spokane, Wash., as follows:

There is a vast territory in northwestern United States and western British America which is now in great need of and could well support a large iron and steel plant. Such an iron and steel works could furnish its products to the Pacific coast, North and South America, and to Alaska and the Orient.

During the last two or three years there has been much agitation for the establishment in the northwest of a plant. The high cost of freight on manufactured iron and steel from eastern United States and from southern Colorado makes the cost of all kinds of iron and steel products unusually high in the northwest and all along the Pacific coast of both continents. In the northwest all the raw materials needed are found in abundance, and as the ore

is of excellent quality for iron and steel manufacture, it is believed to be only a question of time until larger works will be established.

Under the Pittsburgh basing point system, the cost to the western consumer of iron and steel shipped by rail is now the same whether purchased at Pittsburgh, Chicago, or Pueblo, Colo., and the rail tariff are the same from Pittsburgh to all the northwest. For illustration, the freight tariffs per gross ton from Pittsburgh to Helena, Mont., Spokane and Seattle, Wash., are as follows: Steel billets, \$33.60; structural shapes, \$26.88; bridge iron, \$33.60. steel rails, \$33.60, and drill steel, \$26.88.

Iron and steel works close to the Atlantic coast can ship their products via the Panama canal to Pacific ports considerably cheaper than by rail, but to points as far inland from the Pacific as Spokane and Helena there is not a great difference.

The average cost of transporting and handling Lake Superior ores from mine to Pittsburgh furnace is about \$3.25 per ton and it takes nearly two tons of such ore to make a ton of steel. The average cost of transporting and handling iron ore from mine to furnace in the northwest would not exceed \$1.25. Another advantage the northwest has is hydro-electric power that need not cost to exceed \$15 per horsepower per year, which would make rolling mill service remarkably cheap, and even admit of electric smelting of iron ores.

The iron ores of Lake Superior and the cokes of Pennsylvania are 1,500 to 2,000 miles apart. The Hartville, Wyo., iron ores and the Trinidad-El Moro coke used by the Colorado Fuel and Iron Co., are 500 miles apart. In the northwest, in no instance is the iron ore field further than 200 miles from the coking coal, and in some instances the iron ore is almost adjoining the coal or not more than 25 or 50 miles away.

Consumption of iron and steel products in the Pacific West has grown to the proportions of over \$400,000,000 per annum. The cost per annum for drill steel alone in the western mountains is over \$25,000,000. In view of these facts it is surprising that iron and steel manufacturing industries have not been established in the northwest. The lack of them is retarding the growth and prosperity of the country. It is hardly probable that the great iron and steel interests of the United States will allow British interests to monopolize the superior iron ores and coking coals of the northwest, and thereby gain an important advantage in the production of iron and steel, yet their present attitude appears indicative of that result.

For iron and steel making purposes the coking coals of Washington, Montana, British Columbia and Alberta are comparable with those of Pennsylvania and West Virginia and are far superior to those of Colorado. There are large iron ore districts in Washington, the Panhandle of Idaho, western Montana, and in British Columbia and quality compares favorably with those of Lake Superior.

The iron ores of Washington, north Idaho, and west half of Montana, are principally red hematite, while those of British Columbia are nearly all magnetite. Such magnetites as there are in Washington, Idaho, and Montana are usually located near the international boundary. Some of these magnetite deposits are very pure.

Preliminary figures by the Geological Survey showing the production of quicksilver in the United States in 1922, give a total of 6,497 flasks of 75 pounds net, as compared with 6,339 flasks in 1921, which was the smallest annual output in the 72 years of recorded production of domestic quicksilver. In 1922 California produced 3,494 flasks, Texas 2,725 flasks, and Nevada and Oregon 278 flasks.



## A SUBSTITUTE FOR DIAMONDS IN DRILLING

Volomite, a carbide of tungsten said to be made in Switzerland, is the hardest substance known, next to diamond. An article by Dr. Th. Reinhold, geologist to the Netherlands government, in the "Petroleum Times" of February 17th, describes its use and limitations in core drilling. It is set in a steel bit as are diamonds, but the pieces are larger and more of them are used. A thorough investigation into their use has led to the following conclusions:

The average cutting speed of a volomite bit is less than that of a diamond bit under the same circumstances.

The volomite bit cuts well in soft rocks such as shale or slate, sandy shale, soft sandstone, any porous limestone, and marl.

The volomite bit is especially useful in broken or shattered ground, which is especially dangerous for use with a diamond bit. If the volomite bit is broken or lost, the expense is not great. It is the best substitute for the diamond bit in such a case.

In soft ground where the use of a double-barrel core drill is necessary, the volomite bit can be used to advantage.

The conclusion in general is that volomite cannot replace the diamond for drilling, but that it is a useful adjunct, especially in dangerous, broken ground. The two bits can be used consecutively in the same hole.

**STOCK ISSUE WANTED** — In proven mining property, Shining Tree District; must have good directorate, assays, etc. and pay twenty per cent (including five per cent in stock) as commission. INVESTMENT SECURITIES SALES CO. 426 State Street, Schenectady, N.Y.



### PURCHASE OF GOLD ORES

The attention of prospectors and others is drawn to the provision in the Mining Act of Ontario authorizing the Department of Mines to purchase parcels of gold ore taken out by prospectors and others in developing or working mining claims. Arrangements have been made by which such parcels of gold ore, whether large or small, will be accepted by the Timiskaming Testing Laboratories at Cobalt, and paid for according to the schedule provided for the purpose. The Laboratories are operated under the auspices of the Department of Mines.

This offers a first class opportunity for testing the value of ores on a large scale, and also of turning ore of good quality into money for carrying on further development work. By special arrangements, on less than carload lots, freight rates on the T. & N. O. Railway are reduced 50 per cent.

The Laboratories are also equipped for working out the best methods of treatment for gold or silver ores of a refractory or unusual character.

Full information as to treatment charges, schedule of payments, etc., can be obtained from the undersigned, or from A. A. Cole, Manager, Timiskaming Testing Laboratories, Cobalt, Ontario.

THOS. W. GIBSON,  
Deputy Minister of Mines.

Toronto, 12th March, 1923.

## WIRE ROPE & FITTINGS

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### MINES BRANCH

#### Recent Publications

- Phosphate in Canada, by H. S. Spence.  
The Preparation, Transportation and Combustion of Powdered Coal, by John Blizzard.
- Road Materials along the St. Lawrence River, from Quebec Boundary to Cardinal, Ont., by R. H. Picher.
- Building and Ornamental Stones of Canada (British Columbia.) Vol. V., by W. A. Parks, Ph. D.
- Barium and Strontium in Canada, by H. S. Spence.  
The Coalfields and Coal Industry of Eastern Canada, by F. W. Gray.
- The Value of Peat Fuel for the Generation of Steam, by J. Blizzard, B. Sc.
- Analyses of Canadian Fuels. Parts I to V, by E. Stansfield M. Sc., and J. H. H. Nicolls, M. Sc.
- Graphite by H. S. Spence.
- Gas Producer Trials with Alberta Coals, by J. Blizzard and E. S. Malloch.
- Summary Report of the Mines Branch, 1920.  
The Mines Branch maintains the following laboratories in which investigations are made with a view to assisting in the development of the general mining industry of Canada.—
- Fuel Testing Laboratory.**—Testing value of Canadian fuels for steam raising and production of power gas; analyses, and other chemical and physical examinations of solid, liquid and gaseous fuels are also made.
- Ore-Dressing Laboratory.**—Testing of Canadian ores and minerals, to ascertain most economical methods of treatment.
- Chemical Laboratory.**—Analysing and assaying of all mineral substances and their manufactured products. Copies of schedules of fees, which are slightly in excess of those charged by private practitioners, may be had on application.
- Ceramic Laboratory.**—Equipment is such that complete physical tests on clays and shales of the Dominion can be made, to determine their value from an economic standpoint.
- Structural Materials Laboratory.**—Experimental work on sands, cements and limes is also undertaken.
- Applications for reports and particulars relative to having investigations made in the several laboratories should be addressed to The Director, Mines Branch, Department of Mines, Ottawa.
- Summary Report. The annual Summary Report of the Geological Survey is now printed in parts. Applicants should, therefore, state what particular geologist report is required, or what subject they are interested in.
- Memoir 108. The Mackenzie River Basin, by Charles Camsell and Wyatt Malcolm.

### GEOLOGICAL SURVEY

#### Recent Publications

- Memoir 119. The Reed-Wekusko Map-Area, Northern Manitoba, by F. J. Alcock.
- Memoir 121. The Malagash Salt Deposit, Cumberland County, N. S., by A. O. Hayes.
- Memoir 123. Sixtymile and Ladue Rivers Area, Yukon, by W. E. Cockfield.
- Memoir 125. Sedimentation of the Fraser River data, by W. A. Johnston.
- Memoir 127. Beauceville map-area, Quebec, by B. R. McKay.
- Memoir 128. Winnipegosis and Upper Whitemouth River areas, Manitoba, Pleistocene and Recent deposits, by W. A. Johnston.
- Memoir 130. Geology and mineral deposits of the Bridge River map-area, British Columbia, by W. S. McCann.
- Memoir 131. Kenogami, Round and Larder Lake areas, Timiskaming district, Ontario, by H. C. Cooke.
- Map 1585. Mackenzie River basin, 1922 edition. Geology.
- Map 1751. Wainwright, Alberta. Topography.
- Map 1752. Monitor, Alberta and Saskatchewan. Topography.
- Map 1754. Upper Elk and Highwood rivers, British Columbia and Alberta. Topography.
- Map 1829. Salmon River area, Portland Canal mining division, B. C. Geology.
- Map 1831. Vegreville; townships 47 to 55, ranges 11 to 16 west of the 4th meridian, Alberta. Topography.
- Map 1835. Beauceville, Beauce county, Quebec. Geology.
- Map 1836. Explored routes in a belt traversed by the Canadian National Railways between Longlac and Nipigon, Ontario. Geology.
- Map 1860. Keno Hill area, Mayo district, Yukon. Geology.
- Map 1882. Bridge River, B. C. Geology.
- Map 1901. Upper Kitzault valley, B. C. Geology.
- Map 1948. Wanapitei Lake area, Ont. Geology.
- Applicants for publications not listed above should mention the precise area concerning which information desired.
- The Geological Survey will, under certain limitations, give information and advice upon subjects relating to general and economic geology. Mineral and rock specimens, when accompanied by definite statements of localities, will be examined and their nature reported upon.
- Communications should be addressed to The Director, Geological Survey, Ottawa.

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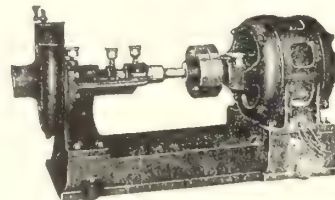
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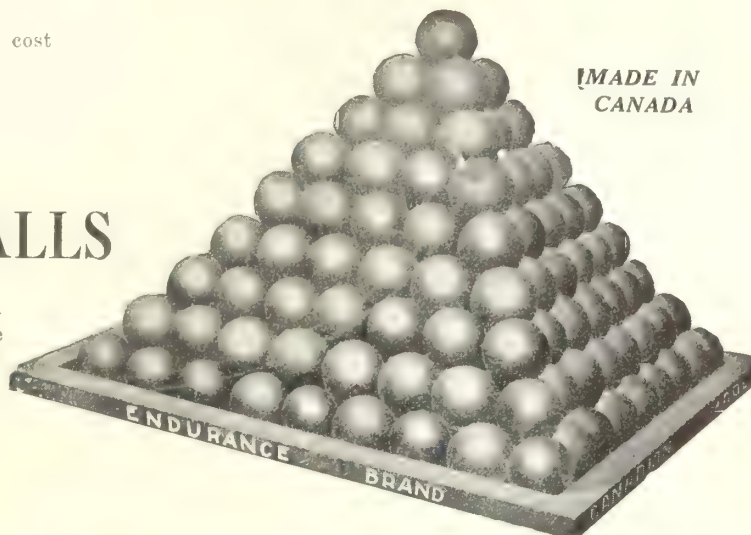
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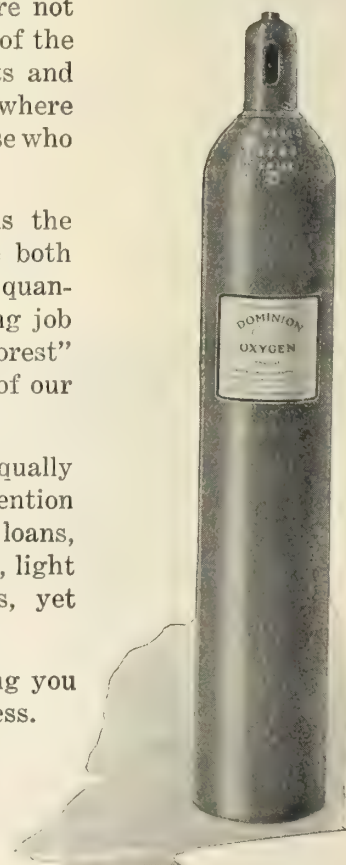
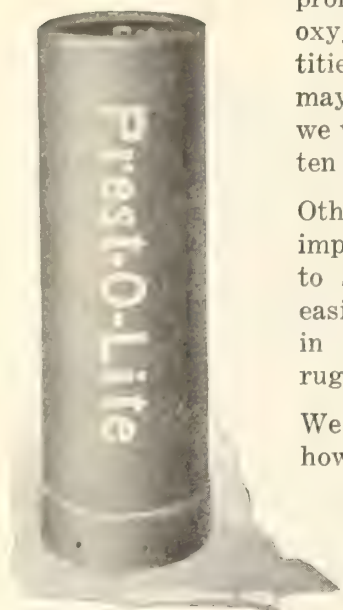
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# Ontario's



# Minerals

PROVINCE OF ONTARIO

DEPARTMENT OF MINES

HON H. MILLS, Minister of Mines

## Mineral Areas.

Ontario, with its 407,262 square miles, contains many millions of acres in which the geological formations are favorable for the occurrence of minerals, 70 per cent of the area being underlain by rocks of pre-Cambrian age. The phenomenally rich silver mines of Cobalt occur in these rocks; so also do the far-famed nickel-copper deposits of Sudbury, the gold of Porcupine and Kirkland Lake, and the iron ore of Magpie and Moose Mountain mines.

## Economic Minerals.

In addition to the above, practically all economic minerals (coal and tin excepted) are found in Ontario:—actinolite, apatite, arsenic, asbestos, cobalt, corundum, feldspar, fluor-spar, graphite, gypsum, iron pyrites, lead, mica, molybdenite, natural gas, palladium, petroleum, platinum, quartz, salt, talc and zinc. This Province has the largest deposits on the continent of talc, feldspar, mica and graphite.

Building materials, such as ornamental marble, limestone, sandstone, granite, trap, sand and gravel, lime, portland cement, brick and tile, meet every demand.

## Mineral Production.

Preliminary returns show the output of the mines and metallurgical works of the Province for the year 1921 to be worth \$48,128,387, of which the metallic production was \$27,574,202.

The following figures show the rapid growth of Ontario's mineral industry by five-year periods since 1891:

| Year.          | Value.      | Year.          | Value.       |
|----------------|-------------|----------------|--------------|
| 1891 . . . . . | \$4,705,672 | 1906 . . . . . | \$22,388,383 |
| 1896 . . . . . | 5,235,003   | 1911 . . . . . | 41,976,797   |
| 1901 . . . . . | 11,831,086  | 1916 . . . . . | 65,303,822   |

## Dividends.

Dividends and bonuses paid to the end of 1921 amounted to \$23,140,734 for gold mining companies, and \$84,388,185 for silver mining companies or a total of \$107,528,919.

## Mining Regulations.

A miner's license costs \$5.00 per annum, and entitles the holder to stake out in any or every mining division three claims of 40 acres each. After performing 200 days' assessment work on a claim, patent may be obtained from the Crown on payment of \$2.50 or \$3.00 per acre, depending on location in unsurveyed or surveyed territory.

## Assay Office.

The Provincial Assay Office at No. 5 Queen's Park, Toronto, is maintained by the Department of Mines for the free identification of minerals, free assays under the provisions of the Mining Act of Ontario, and also for general assay work as per the Schedule of Charges which may be obtained on application.

## Temiskaming Testing Laboratories

The Department maintains, at Cobalt, an ore sampling and testing laboratory which is now prepared to receive parcels of gold ore from 100 pounds upward, and after sampling and assaying the same to pay to the shipper the value thereof, less treatment charges. The purpose is to afford a market for ores extracted by prospectors and others in developing their mining claims, enabling them to obtain funds which they can use for further work and to report on the most satisfactory method of treatment. Fuller information may be obtained on application to the Manager, Temiskaming Testing Laboratories, Cobalt, Ontario.

## Publications.

For list of publications, illustrated reports, geological maps and mining laws, apply to

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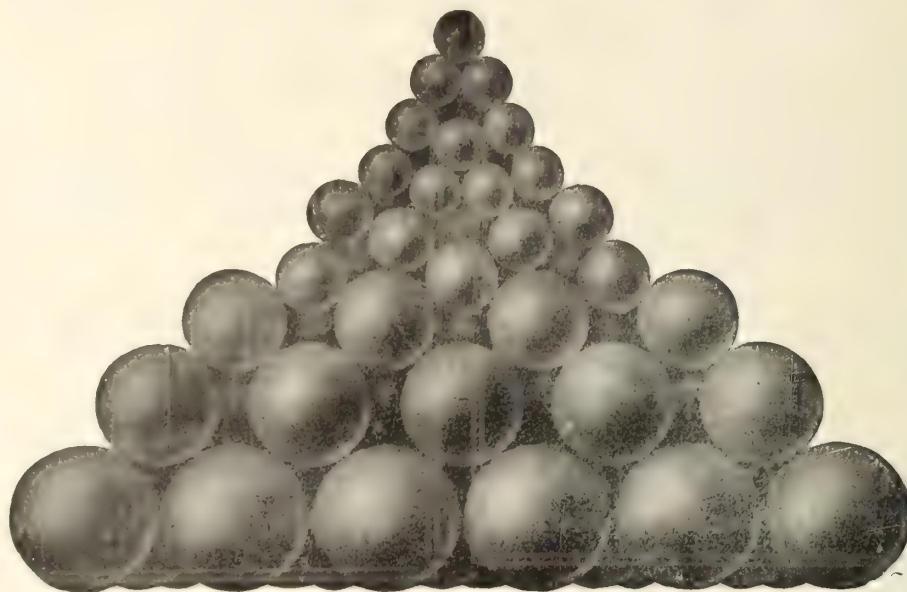
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PUBLISHED WEEKLY

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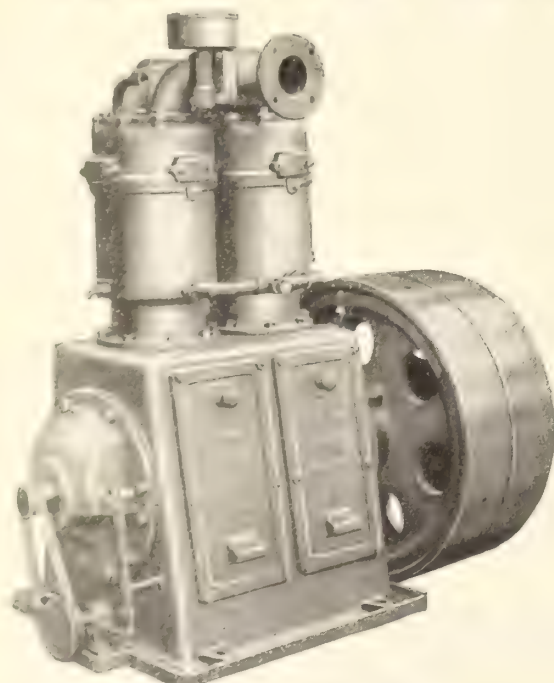
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# -:- EDITORIAL -:-

## IMMIGRATION AND MINING

Who in Canada wants immigrants? From the recent public discussions in Parliament and in the press we gather that, though we all want immigrants on general principles, most of us object to an influx of new comers into our particular spheres of endeavour. The farmers of the thinly peopled West want no additional surplus to crops that remain unsold. Industrial workers in large numbers remain unemployed and their unions object to added competition for "jobs". The people of Quebec wish to settle their outlying lands with their own kith and kin, available in plenty from the natural increase in population and from repatriation. The railway and steamship companies, aided by the little band of altruists who wish to see Canada grow and prosper, alone uphold the cause of immigration. Our federal executive is strictly "on the fence."

The truth is that if we are to absorb large numbers of immigrants within a short period, it must be on the basis of a diversified and well-rounded development. This development must provide at one and the same time additional markets for the products of farm, mine, forest and sea, as well as for manufactured materials. We can depend upon the additional export of these products only to a comparatively limited extent. We must make our own markets within our own borders. Thus were the vast vacant spaces of the United States filled in a phenomenally short space of time, and only thus can we hope to effect a similarly rapid settlement in Canada.

Among the agencies that stimulated settlement in the central and western parts of the United States, none approached in importance the series of mining booms. These drew men, a fine type of men, from all quarters of the globe. Once there, a large part of them settled on the land, where they found ready and lucrative markets in the growing mining camps. General industrial development followed settlement. The chief legacy of the mining booms of half a century is the rapid settlement and the present prosperity of the quarter-continent throughout which the booms took place.

What happened in the United States will take place in Canada, probably not on the same grand scale, but with the same general effect. The fertile valleys of British Columbia will be tilled when near-by mines and smelters provide a market for their produce. The prairie lands will smile in full prosperity only when

the discovery of iron ore within reach of Alberta's coal beds shall have stimulated there the growth of a second Pittsburgh. Winnipeg's future as a great industrial centre will be realized only when the mines of its hinterland send down their products to this gateway of the West in exchange for the food and supplies they require. When Canada commences to use Canadian iron ore, northwestern Ontario will hum with activity.

The nickel mines of Sudbury have stimulated already the settlement of farming districts that would still be unproductive but for their operation. The gold district of northeastern Ontario has proved its potency as an agency for settlement, and the new area in northwestern Quebec promises to do likewise on behalf of this eastern end of the Great Clay Belt.

Recently Parliament spent days in futile argument about the assistance of immigration to the extent of \$700,000. During the progress of the debate, the sum of \$700,000 was voted, with little protest, to provide the salaries of outside immigration officials. The days and weeks of speechifying, where they meant anything, discussed the principles upon which an immigration policy should be based. Nowhere in the debates or in the public discussion that followed have we found evidence that it is clearly understood what a great part mining development can, and must, take in settlement.

If Canada is to be settled rapidly, it will be principally by virtue of her expanding mineral industry. When this fact shall have been grasped clearly by a sufficiently large part of the Canadian public, then, and only then, can we expect our business men, our industrial leaders and our legislators to take steps to encourage and aid this, the most effective of all immigration agents.

## A GIFT TO SCIENCE

In his letter offering to the Royal Society a gift of £100,000 for the purposes of scientific research, Sir Alfred Yarrow has given a remarkably clear and concise statement of the circumstances and importance of this branch of science, now and forever dependent principally upon such private benefactions, in addition to public subsidy. We reproduce this letter in part on another page.

Fortunately for the industrial future of Britain, there are a number of her leading citizens, in both private and public life, who are firmly seized of the prime importance of scientific research. Under the



stimulus and direction of a well organized and vigorous National Research Council, literally thousands of commercial firms have combined, each with his fellow, in research associations. This latest benefaction will, we take it, be applied to the development of pure science rather than to its industrial application.

In Canada we have had as yet neither public subsidy nor private gifts to research on a scale that ensures the future of our industry and commerce. With the exception of work in our universities and in certain government departments, research in Canada is conspicuous principally for its absence. There are some notable exceptions to this rule; but as yet the bulk of our industries remain untouched by the magic wand of the researcher.

### MR. BELLEW AND LABRADOR GOLD

At last we have a signed statement from Mr. Henry C. Bellew, M.E., the promoter of Labrador Gold, Limited. It appears on page 581 of the March 15th issue of "The Canadian Gazette," a semi-official publication issued in London. We must confess to being rather disappointed with the brevity and vagueness of the information about the gold described under the caption "The Gold Strike on the Labrador." In three-quarters of a page Mr. Bellew mentions gold three times. The remainder is a very good description of that part of the Labrador coast, which Mr. Bellew knows well from his unsuccessful search for pulp-wood there.

"That it was known for many years that gold was said to exist on the Labrador is a well-established fact." With this remarkable statement Mr. Bellew introduces the story of the early explorers on "the Labrador". Coming down to the more recent interest he says:

"In view of the interest lately taken in Labrador owing to the reported gold discoveries upon Big Brook and Black Duck Brook, a few words about these 'rivers' may not be amiss."

Then follows the excellent description of the coast line above referred to. At the end, getting right down to the point announced in the title of the article, Mr. Bellew says:

"Gold was first discovered in Big Brook in July, 1921, and during the month of September, 1922, in Black Duck Brook. The rivers flowing into Adlavik Bay were reported also to be rich in gold during November, 1922, resulting in quite a stampede for mining licences for these rivers, all of which points to an old-fashioned rush as soon as navigation will permit this summer."

If only Mr. Bellew had been freer with his information and less non-committal in his statements in this article of his, we might have had more comment to make. Possibly the strict laws in Britain dealing with fraud have something to do with Mr. Bellew's guarded

statement. We have gathered from Canadian publications a wealth of information about the placer fields about which Mr. Bellew is in this case so reticent; but of course, that had been merely passed on to the reporters, and thus circulated not only free of charge, but free of any possible embarrassing consequences to Mr. Bellew.

On to Labrador and fortune!

### MR. CAMPBELL REPLIES

After a winter vacation that has re-invigorated both mind and body, Mr. C. M. Campbell has returned to his professional duties at Cassidy, Vancouver Island. Likewise he has returned promptly to the defence of a principle that he considers rightly to be of grave importance. Though we do not agree fully with Mr. Campbell in his deductions and conclusions, we respect and admire the spirit that prompts him to uphold, single handed, the cause of conservative judgment and regulated statement as applied to Canada's mineral resources.

There is no doubt that part of the statements and deductions to which Mr. Campbell takes exception are exaggerated in much the way he suggests. Startling statements usually contain an element of exaggeration; but they may be eminently useful in spite of this fault, provided the cause is just and subsequent action well-founded. There is no doubt that the general public has been insufficiently informed about the facts of the mining industry and its potentialities. These have now been well advertised by the addresses of Dr. Corless and others. The limitations of our own and any mining industry must not be overlooked, and Mr. Campbell has attended to that phase of the subject. We judge, however, that the case for sound and economical development of our mineral resources can be left safely in the hands of our trained mining engineers.

A point that has not been discussed at the length it deserves in the series of letters and addresses (not neglecting the verses) centering round this question, is the influence the mining industry exerts, directly and indirectly, in the development of the other industries, basic and secondary, in a new country. This influence, we would judge, has a value far in excess of that marked by the actual mineral production. We have indicated today in another place the intimate relation of mining development and settlement of the land. This applies similarly to all other industries, as well as to the professions.

It may be that the mining industry is to a new country what leaven is to the loaf. History justifies this conclusion. We would judge that those who have argued optimistically about the future of our mining industry must have this point in mind, though they have not always expressed it. We would judge that Mr. Campbell, on the contrary, has confined himself



to the letter of the argument, else he would have credited mining with a larger importance in our national development.

An important point that, though not new, has not been touched upon heretofore in this controversy, is brought out clearly by Mr. Campbell in today's letter. He points out that in our zeal for greater and still greater mineral production, we are apt to overlook the basic requirements of conservation and to squander, for a temporary gain, an unreplaceable and rare resource. This is well illustrated by two remarks that have been going the rounds recently. An English writer says: "Always remarkable for improvident destruction of natural wealth, the Americans have destroyed their national wealth with a recklessness that strikes many shrewd observers as suicidal." J. Parke Channing said recently: "I think we can safely say that the copper resources of the world are extremely limited, — more limited than any other of the base metals; and unless new deposits are found, we will be threatened in fifteen years with another shortage of copper." We commend this point in Mr. Campbell's letter to the attention of every thoughtful mining engineer.

### ARGONAUT FINANCING

In the letter we print today, Mr. J. H. Rainville, president of Argonaut Gold, Limited, has chose to confine himself principally to recrimination. We had hoped he would state publicly the grounds upon which the recently authorized addition of \$1,000,000 stock was made and upon which his own high hopes and those of Argonaut shareholders have been based. It is interesting to know that Argonaut has acquired control of the Huronia Company as well as additional claims adjoining the Argonaut and others in Rouyn township; but it would be much more to the point to know the basis for that extra million of stock. Rumours have been in circulation lately as to new developments, and we had hoped for confirmation of these rumours from Mr. Rainville. He does not choose to discuss the matter, so we must perforce stick to the facts upon which we based our former judgment of the case.

Mr. Rainville's personal probity is beyond question, as is his faith in the Argonaut property and his determination to make it succeed. He has staked both his personal fortunes and his reputation upon the success of the property. We fear, however, that his enthusiasm has led him to adopt financial methods that are not in accord with sound mining practice. His judgment in mining matters can be called in doubt with reason, judging from another and much less reputable venture with which he has associated himself.

While the Argonaut property was still virtually a prospect, its promoters financed it by public subscrip-

tion, the method adopted involving a ruinous discount on the sums subscribed and a corresponding burden on the property. A year ago when the mine records showed a very modest amount of ore disclosed in the workings, a series of advertisements over the company's name soliciting subscriptions to stock described "ground only scratched and \$4,000,000 of gold already located" in "the most persistent, most permanent and most wonderful vein ever opened up in the North Country." This latter is quoted from Mr. J. W. Morrison, then and now in charge of mining operations, who, in view of the fact that at the time he was searching vainly for the continuation of the faulted vein, might well have denied or qualified publicly the ridiculous statement attributed to him.

Mr. Hardman's letter, which we published last week, deals principally with this period of the property's development. It is noticeable that, in upholding the mine's value, he discreetly omits mention of the *quantity* of ore available — rather a serious omission, in view of his being an engineer. We should like to point out for Mr. Hardman's benefit, by the way, that we (the editor) are solely responsible for the statements he criticises. We are surprised to learn (by the way, also) that Mr. Hardman considers himself the reverse of an optimist; we had always understood that he and his undertakings were at the hopeful end of the scale.

We have been informed privately that the mining position of Argonaut is now vastly improved over that of a year ago. We hope that the rosy views of today may prove to have a more substantial foundation than those expressed a year ago. We have been informed too, that the milling difficulties are all overcome, only to learn later that the method to be adopted is still in doubt. We should like nothing better than to see a substantial new unit added to our gold mining industry by the shores of Beaver-house Lake. But the most fortunate outcome will not excuse the financial methods that have been adopted to raise money for the development of Argonaut, which methods we hold to be intrinsically unsound.

Shortly after the Hollinger became a mine, one of its original owners explained to a young engineer seeking advice that he and his partners never had offered, and never would offer, to the public any mining stock on which they could not ensure a reasonable return. This stand exemplifies what is, or should be, axiomatic among mining men. If the rule is broken, it may or may not be at the expense of those that buy the stock; but always it is at the expense of the mining industry as a whole, whether the mine pays or not. The "Canadian Mining Journal" holds a brief for the mining industry. We find that the Argonaut promoters have broken sadly the rule, and we have pointed to the fact publicly. They may retrieve themselves; we hope they will; but a successful issue should not be allowed to conceal the facts of a false start.



## THE NORTHERN PROSPECTOR

With Summer gone, and Autumn chill  
Painting its colors on the hill,  
My meagre store of treasure spent,  
I fill my packsack, and content  
Stem with my bark the current through  
With aspirations born anew.

When Winter's skies are gray and cold  
I still pursue the hunt for gold.  
My snowshoe's trail invades the lair  
Of wolf, and moose, and slumb'ring bear.  
My hut in banksian thicket's lee  
From howling blizzard shelters me.

When Springtime's mist on marshland lies,  
My tent's invaded thick with flies;  
Clouds of mosquitos buzz and sting;  
The sandfly comes on noiseless wing;  
And in the alders' moistened shade  
The blackflies lay an ambuscade.

Tormented by the pests, I swear  
I'll leave this land for anywhere;  
And find in some enchanted clime  
A peaceful life. Then comes a time  
When Summer sun with drying ray,  
Subdues and drives the pests away.

The land's wide treasures still unfold,  
From where are ridges veined in gold,  
To other rocks, with silver seams,  
Rich as the treasures seen in dreams.  
The landscape fair with sunlight kissed,  
Makes every man an optimist.

Away! dull thought of Winter skies;  
Away! remembrances of flies;  
With life and health the chance is there  
To wrest from nature treasures rare;  
To carve in stone the lasting fame  
That gives to some great ledge, my name.

Henry Elwood McKee.

## A GIFT TO RESEARCH

Sir Alfred Yarrow, the famous designer and builder of high speed vessels such as torpedo-boat destroyers and other special craft, recently gave £100,000 to the Royal Society, London, for the purposes of scientific research. In his letter offering this gift in the service of research, Sir Alfred says:

"I have, for many years, held the view that the prosperity of this country has been greatly hampered in the past for the want of better promotion to scientific investigation and its application to practical affairs. I am convinced that the future prosperity of this country will be largely dependent upon the encouragement of original scientific research.

"The birth of new industries, and the development of existing ones, are due largely to the growth of science, thus securing employment and the welfare of the whole community being advanced. It is doubtful whether even yet it has been realized how completely this country would have been at the mercy of our antagonists in the late war had it not been for the research work done by our scientific men before the war and during its course.

"I desire to mark my sense of the value of research to the community by offering, as a gift to the Royal Society, £100,000, to be used as capital or income for the purposes of the Society, as the Council may think fit, because I recognize that conditions alter so materially from time to time that, in order to secure the greatest possible benefit from such a fund, it must be administered with unfettered discretion by the best people from time to time available. Care must, of course, be taken that a gift from the fund shall in no case lessen any Government grant.

"In accordance with your practice, you would, I assume, appoint a committee to administer the fund, and would also frame rules for the guidance of the committee, while reserving the right to alter such rules from time to time; and I would suggest that they be reconsidered by the Council every tenth year so as to meet modern needs. I should prefer that the money be used to aid scientific workers by adequate payment, and by the supply of apparatus or other facilities, rather than to erect costly buildings, because large sums of money are sometimes spent on buildings without adequate endowment, and the investigators are embarrassed by financial anxieties. Although I thus give a general expression of my wishes, I do not intend, by so doing, to create any trust or legal obligation for their fulfilment.

"In conclusion, I should like to record my firm conviction that a patriotic citizen cannot give money, or leave it at his death, to better advantage than towards the development of science, upon which the industrial success of the country so largely depends."

This letter shows a grasp of both the uses and the needs of scientific research that all too few, either in Britain or in Canada, possess at present. Sir Alfred Yarrow's own business has been founded upon the systematic application of that spirit of well-directed scientific curiosity that we call research, as are most of the great and sound business enterprises that have made Britain famous as the world's workshop. With his intimate knowledge of conditions in Britain, Sir Alfred discerns a slackening-off of the effort upon which her commercial supremacy rests to such a marked extent; hence his magnificent gift in aid of that branch of scientific endeavour by aid of which he accumulated his personal fortune.

A discerning note of direction contained in this letter is the advice that the gift should be used to support the personal needs of researchers rather than to provide them with the premises for their work. This is in marked distinction to the common tendency, which requires a visible monument in the shape of buildings or mechanisms to provide a memorial to the donor. This added and unusually discriminating touch may well be marked for reference by all interested in the fortunes of scientific research.

A sixty-ton shipment of pitchblende received lately in Belgium from the new deposits in the Katanga region of the Belgian Congo contained 50 percent uranium oxide, from which about eight grams of radium could be extracted. It is this phenomenal richness of the new deposits that has given them their present control of the world market.

## RECALLING THE ALCHEMIST

By P. B. McDONALD\*

What chemist, toiling in his laboratory and making those musty smells typical of the profession, has not been inspired by visions of the medieval alchemists? These same alchemists, some authorities say, were stupid obstacles in the path of knowledge; whereas other authorities glorify them as the wise men of their time, working in an age of darkness for the fragments of knowledge that have grown into modern chemistry. At any event, the medieval alchemist was a picturesque figure; visions of him bending in his robes and cap over his curious mixtures have lent the color of romance to many a dreary laboratory, where testing of fertilizers and analysis of slags have replaced the search for the philosopher's stone and the elixir of youth.

Alchemy has been distinguished from chemistry by Perpetys as being the art of trying to complete in the laboratory the process that nature began; while chemistry is the art of destroying the compounds nature has formed. That is, the alchemists wished to change base metals into gold and silver, prolong life, raise the dead, create human beings by chemical formulae, and generally to learn the basic and mystic secrets of matter. They were influenced by religion and sex, since those mysteries were of paramount importance. One prevalent belief was that unity is a trinity, and trinity a unity; that the material world is composed of sulphur, mercury, and salt, just as the divine world is composed of Father, Son, and Holy Ghost. Mercury, said these learned men, is the passive and female principle corresponding to matter; sulphur, the active and male principle, is force; salt the middle term, is movement which applies force to matter.

These principles were harmonized with the teachings of Aristotle, whom they blindly followed. The great Greek scientist had suggested that all things consisted of four elemental properties; fire, the property of dryness and heat; air, the property of wetness and heat; water, the property of wetness and cold; and earth, the property of dryness and cold. The alchemists adopted these four states of matter and sought them in all substances. Everything hot was called fire, everything cold and subtle was called air, everything moist and fluid was called water, and everything dry and solid was called earth. Quoting from J. Cambell Brown's history of chemistry, "But as heat changed liquids to vapor, and consumed solids, they reduced the number of visible elements to two—earth and water, which contained within themselves the invisible elements fire and air. They were thus able to apply the conception of the three principles to that of the four elements. Earth corresponded to philosophical sulphur, and water to philosophical mercury. Later when they conceived philosophical salt, they devised a fifth element called quintessence, or ether, which corresponded to the third principle." This was in agreement with Aristotle because he had recognized a fifth element of ether and added it to the standard four. If an alchemist distilled wood and obtained an inflammable gas, a liquid oil, and a solid residue, he said that he had decomposed the wood into its elements—fire, water, and earth.

The metals, they thought, were conceived by sulphur acting as father and mercury acting as mother. These were not ordinary sulphur and mercury, but philosophical

principles of them. Nature sought to produce perfect metals of gold or silver, but was checked by such causes as impure mercury or sulphur, lack of time in the bowels of the earth, planetary influences, etc. Instead then of gold and silver, were produced the imperfect metals of mercury, copper, iron, tin, or lead. As to planetary influences, it was said that the influence of the sun brought gold, of the moon silver, of the planet Mercury mercury, of the planet Venus, copper, of the planet Mars, iron, of the planet Jupiter, tin, and of the planet Saturn, lead. Paracelsus, who was born the year after the discovery of America, declared that he could calculate when and how this planetary influence took effect. This belief in the relation of the metals and the planets had come down the ages from the Babylonians.

In his famous play "The Alchemist," produced in 1610, Ben Johnson has the alchemist Subtle defend his art to a doubter named Surly. Following is part of the conversation in the second act:

Seems so impossible?"

*Subtle.* "Why, what have you observed, sir, in our art,

*Surly.* "But, your whole work, no more.

That you should hatch gold in a furnace, sir,

As they do eggs in Egypt!"

*Subtle.* "Sir, do you

Believe that eggs are hatched so?"

*Surly.* "If I should?"

*Subtle.* "Why, I think that the greater miracle.

No egg but differs from a chicken more

Than metals from themselves."

*Surly.* "That cannot be.

The egg's ordained by nature to that end,

And is a chicken *in potentia*."

*Subtle.* "The same we say of lead and other metals,

Which would be gold if they had time."

*Sir Epicure Mammon.* "And that

Our art doth further."

*Subtle.* "Aye, for 'twere absurd

To think that Nature in the earth bred gold

Perfect in the instant; something went before.

There must be remote matter."

A little later Subtle launches into a detailed explanation, which must have been somewhat tiresome to the audience, if audiences in Shakespeare's day were at all like those of our modern business-men. During his speech Subtle refers to sulphur and quick silver as "the parents of all other metals."

"Nature doth first beget the imperfect, then  
Proceeds she to the perfect. Of that airy  
And oily water, mercury is engendered;  
Sulphur of the fat and earthy part; the one,  
Which is the last, supplying the place of male,  
The other of the female in all metals.  
Some do believe hermaphrodeity,  
That both do act and suffer."

It is difficult for us to realize the extent and ramifications of medieval alchemy. For centuries these quacks and wise men (for they were a little of both) developed their systems and influenced the life of their time. All kinds of magic and mumery became added to their practices, making gunpowder to compounding love philtres. But many of the alchemists were monks, and worked with a

\* College of Engineering, New York University



...s purpose rather than to make money. They would communicate their knowledge, but preferred to restrict it to a select circle. Brown gives a medieval recipe for rendering the human body immune to fire: "Take juice of double yulya, white of egg, seeds of persil, and lime. Pound together, and prepare them with white of egg mixed with juice of sapin. Anoint your body or hand with this composition, allow it to dry, repeat the anointing, and then you can bodily sustain the ordeal by fire."

Almost invariably they disregarded gases. When they wished to heat anything for a long period at a uniform temperature, they made use of a special furnace. With this they often used a glass vessel hermetically sealed, which they called the 'philosopher's egg.' As there was no escape for vapor or heated air, this piece of apparatus became a sort of bomb-shell, and not infrequently exploded with disastrous results to the alchemist.

In addition to the seven metals mentioned, they used antimony sulphide and bismuth. Zinc was held of small account except in the making of alloys, and was not recognized as a distinct metal until the sixteenth century. Compounds of potassium and sodium were known; sodium carbonate, for instance, came from the Lakes of Natron in Egypt, where it had been obtained for centuries for preserving mummies. Ammonia was known, particularly as sal ammoniac, but of ammoniacal gases, as of all gases, they were strangely ignorant. Says Brown, "Paracelsus mentions the production of an inflammable gas when iron is treated with acid in water, so he must have at least seen the flame of hydrogen; but he went no further, and it was left to Cavendish in 1766 to discover this important element. Sulphuretted hydrogen was observed as an unpleasant odor arising in certain chemical operations, but the gas was not known."

Of the alchemists in general, H. G. Wells says in his "Outline of History," "These alchemists were in close touch with the glass and metal workers and with the herbalists and medicine-makers of the times; they pried into many secrets of nature but they were obsessed by 'practical' ideas: they sought not knowledge, but power; they wanted to find out how to manufacture gold from cheaper materials, how to make men immortal by the elixir of life, and such vulgar dreams. Incidentally in their researches they learnt much about poisons, dyes, metallurgy, and the like; they discovered various refractory substances, and worked their way towards clear glass and so to lenses and optical instruments; but as scientific men tell us continually, and as 'practical' men still refuse to learn, it is only when knowledge is sought for her own sake that she gives rich and unexpected gifts in any abundance to her servants. We live today largely in the age of the alchemists, for all our sneers at their memory. The 'business-men' of today still think of research as a sort of alchemy."

### AN ENGLISH OPINION OF CANADIAN GOLD AREAS

A general study of the gold mining possibilities of northern Ontario and Quebec is given in the "Mining Magazine" (London) for March by A. L. Webb in an article, "The Future of Central Canada as a Gold Producer." Mr. Webb sums up his impressions thus: "The conclusion is that, while proof of mineral value is abundant, only indications, and not definite discoveries, will be the rule in the first stages of development of Central Canada. The diamond-drill is more and more becoming the means of locating ore-bodies, and values are being tested by winz- ing and underground development. These undertakings

are beyond the scope of individual enterprise. More capital is required than the prospector is prepared, or able, to find and failure is quite as likely as success to attend his efforts. Success will, however, more than counterbalance a number of failures, and this principle is behind the numerous enterprises which are today being financed in the United States for thoroughly and scientifically testing each individual deposit."

### SMILES

A remarkable statement by Capt. P. Louis Bowler, from which the following paragraphs are extracted appeared in the March 17th issue of "The Mining World and Engineering Record." Evidently the editor of this mining publication, as well as Capt. Bowler, lapsed a trifle on Canadian geography, or else both studied a very small-scale map, without any scales of miles, with this result:

"The opinion of well-informed mining men is that the year 1923 is destined to witness a gold rush to Northern Ontario, Quebec Province and Labrador, by reason of the recent discoveries, and information regarding the great extent of the rich gold-bearing belts reaching from Timmins, Porcupine, Kirkland and Larder Lakes in the west to "Stagg Bay," "Big Brook River" and Hamilton inlet on the Labrador coastline, as its eastern point, embracing a gold belt approximately 350 miles in length, and about 200 miles in breadth. So far as ascertained within this area, there are two defined series of reefs, running parallel with each other, and recent discoveries have disclosed wonderfully rich and extensive deposits of gold-bearing gravels lying adjacent to long stretches of outcrop lodes showing remarkable values in its veins and fractures.

"In my last article on gold in Ontario, which you published, I hinted that great discoveries would be made east and N. E. of Kirkland and Cochrane. The news now to hand has borne out my statements. A great rush is taking place to Stagg Bay and Big Brook river, where many washings from 25 to 56 lb. of gravel have yielded to the lucky panners \$100.00 worth of gold, while in several creeks gold dust lies on the surface, and at 5 ft. depth large placer nuggets have been secured.

"Another great rush is developing at Rouyn, 50 miles east of Dane Station on the T. and N. O. Railway, laying between Opasatika Lake and Kinojevis Lake, all east of Kirkland and Larder Lakes. Prospectors have found in this field veins yielding up to \$1,000 per ton; also astonishing yields from alluvial ground. Some of the outcrops are very wide, and give every appearance of being deep-seated.

"Thousands of hardy prospectors are awaiting the snow to melt to go in, and old-timers who have pegged out claims exhibit almost childish enthusiasm on the extraordinary results of their sampling; while geologists and mining engineers are all agreed that there lies in these belts an enormous source of untapped wealth, between Porcupine and the Labrador Coast."

Now that Capt. Bowler has corroborated in London the statements about Labrador Gold made so frequently in Canadian newspaper advertisements, who can doubt them? The alluvial ground in northwestern Quebec (which we in Canada learn of here for the first time) is evidently a small surplus brought by the glaciers from Labrador during one of their periods of promiscuous rambling across the continent. When Capt. Bowler starts on his tour of inspection of the new gold field across-country from Porcupine to Hamilton Inlet next summer, it would be advisable for him to take an extra pair of socks and some extra grub in addition to his usual equipment for woods travel.



## Use of Welding at Mines And Metallurgical Works\*

The use of oxy-acetylene at coal mines is almost universal, and to-day the process is being extensively employed also in the yards and at the docks of the distributor.

Coal handling machinery for unloading colliers and coal barges and for loading railway cars and trucks is composed for the most part of heavy units. This machinery is usually operated to capacity when shipments are being received or dispatched and when a breakdown occurs it is always urgent to effect repairs



Fig. 1. Parts Reclaimed by Welding

with the least possible delay, not only to avoid demurrage charges but to make way for other shipments. In such emergencies oxy-acetylene plays a very important role.

The superintendent of the central welding and repair shop of a large coal company in the Great Lakes district states that he always depends on oxy-acetylene for the repair of parts that are urgently needed. This company owns several coal yards, conducts an interstate business, and operates approximately four miles of docks. Oxy-acetylene welding and cutting apparatus is used in yards and at the docks for repair and reclamation work, a large part of which is done



Fig. 3. Wrecked Cast Steel Cable Sheave Wheel After Reclamation

in a central shop. There is considerable work, however, which can be done in place and which it would be difficult to bring to the shop, and portable equipment is kept in readiness for emergency work of this kind.

The four small wheels shown in Fig. 1 are cable

\* By courtesy of "Oxy-Acetylene Tips."

carriers. When received from the mill these were  $\frac{3}{4}$  in. too narrow. They were sent to the welding shop where a strip of steel  $\frac{3}{4}$  in. wide was welded to the inside of the wheel rim to bring it to the proper width. Three of these wheels in the photograph show the welded surfaces before machining. The remaining one shows the job after machining. The work was done in less time and at less cost than would have been entailed in providing new wheels. When the rims or flanges of wheels of this kind are badly worn in ser-

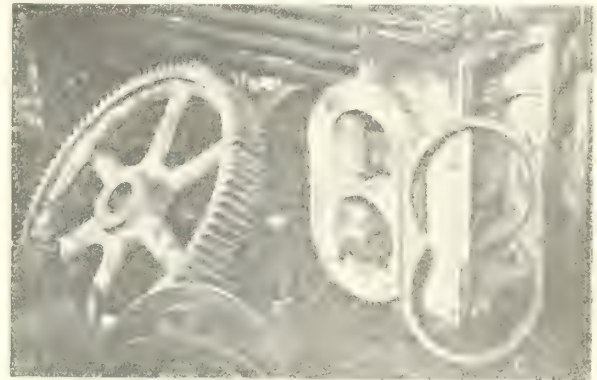


Fig. 2. Other Typical Reclamation Work

vice, it is customary to reclaim them merely by building up the worn surfaces with the welding blowpipe and a suitable filler rod.

In the same picture are seen a gear wheel and a boom drum part, both of which were reclaimed by welding. The part contains approximately 40 inches of welding, including the building up of the shaft which is clearly seen in the picture.

Fig. 2 shows a number of objects that had been reclaimed by welding. At the right is an air compres-



Fig. 4. Miscellaneous Machinery Parts Reconditioned or Repaired by the Oxy-Acetylene Process

sor cylinder. To make this cylinder adaptable to the machine for which it was intended it was necessary to increase the width of the flange (shown in the fore part of the picture) by  $1\frac{1}{8}$  in. To do this a casting like the one shown leaning against the reclaimed cylinder was made and welded onto the flange in place.





Fig. 6. Fire Destroying a large Concentrating Plant



Fig. 7. Cutting a lane through the Tangled Mass of Steel



Fig. 8. The Wreck of the Concentrator, showing Removal of Steel Debris after being cut by Oxy-Acetylene Torches

ally cast, thus providing the additional  $\frac{1}{8}$  in. necessary for the gasket. The compressor unit is valued at several hundred dollars and but for oxy-acetylene it would have been a complete loss excepting for its scrap value. The other objects in this picture are a gear wheel, a derrick part and an eccentric shaft with wrist pins in the foreground. All of these were saved from the scrap pile by oxy-acetylene.

The cable sheave wheel in Fig. 3 had two broken spokes and the hub was badly worn. The wheel is cast steel. The broken spokes were welded and the hub was built up 2 in. on each side. This work was done in less than a half a day and saved the cost of a new wheel, which in this instance would have been considerable because of the fact that the particular size and type of wheel is obsolete and a special casting



would have been necessary. Fig. 5 shows an oxy-acetylene operator welding copper bonds on crane rails of loading and unloading tipples. The welder is really rebonding in this case. After the bonds have been in service for several months they become more or less oxidized and the constant vibration tends to crystallize the metal which eventually breaks. The breaks invariably occur where the wires are bent. There is no instance in which one has broken at the weld. This company makes all of its bonds in yards and at the docks with wire reclaimed from old motors and welded by the oxy-acetylene process. In rebonding the old weld is melted down to form a surface for the new bond and the connection is then made with the blow-pipe, using a piece of the same kind of wire for filler rod. The same filling material is used when the bonds are made on new rails. The time required to replace a broken bond with a new one is approximately four minutes, including the preparation for bonding and moving the equipment from one rail joint to another. It will be noted that the bonds are welded to the flanges of the rails. It is not practicable to weld either to the ball or the web because of the double flanges on the wheels of the cranes.

Other oxy-acetylene work accomplished by this company and which is considered as ordinary practice includes repairs on various parts of clam-shell buckets.



Fig. 5. Oxy-Acetylene Operator Welding Copper Bonds to Crane Rails

Worn edges are built up. If one of the large arms on the side of the buckets breaks, and breaks are not uncommon, instead of buying an entire new arm only the angular section of the arm where it is attached to the side of the bucket is purchased. This is a special casting. The straight section of the broken arm is then cut with oxy-acetylene and welded to the new casting. This operation saves approximately \$200 each time a repair of the kind is made. Cable fair-leadings on clam-shell buckets when worn or broken are welded and machined, being thus reclaimed at a fraction of the replacement cost.

In maintaining the steel structures of the coal handling machinery, oxy-acetylene welding and cutting are often used. These structures are mobile and the stresses to which they are subjected are constantly at work loosening joints and not infrequently breaking members. Repairs on these parts can usually be effected without dismantling them. The operator takes his portable apparatus to the points where the work is to be done and does all the necessary welding and cutting in place.

The company operates a large fleet of motor trucks and one welding operator spends at least a day each

week in the garage making repairs. The trucks have all-metal, automatic dump-bodies. Welding and cutting work in the garage consists of building up worn parts of the body-lifting devices and repair of frames that are broken or the strengthening of the weak joints by reinforcing them with welded patches. There is also considerable cast iron and aluminum welding on crank cases, burning out of carbon with oxygen and general maintenance work.

Figures 6, 7 and 8 illustrate a fire that destroyed a large concentrating plant in a Western mining camp a few months ago. These pictures show the big fire in progress, the devastation that was wrought and oxy-acetylene cutters engaged in clearing away the debris. Incidentally there goes with these photographs a chapter of emergency service that is worth reviewing.

No sooner had the smoke cleared away above the ruins of the burned concentrating plant than the management took steps to remove the wreckage which covered acres of ground, a veritable morass of warped steel. It was important to make way for the construction of the new mill with the least possible delay, because the large mines and the smelter would have to practically close down until the new concentrating mill was completed and in operation.

An emergency call for oxygen was one of the preparatory steps. Then an order for four generators, eighteen cutting torches and various other equipment was placed with a large apparatus manufacturer, and within two weeks a crew of fifteen oxy-acetylene cutters was at work burning a lane through the wreckage. The operation was somewhat similar to cutting a road through heavy timber with a crew of lumberjacks.

As soon as a passage was opened, space was cleared at the further end and construction of the new mill was begun, the operators meanwhile clearing away the remaining wreckage as construction progressed, so the erecting crews might encounter no delay.

The mechanical superintendent was greatly pleased with the service rendered by the apparatus company. At last reports practically all of the cutting had been completed, and it was said that many applications of the oxy-acetylene process would be made use of in the construction of the mill. Even at that time the company was constructing a 12-in. water pipe line of steel, all the joints of which, including longitudinal, were being welded.

## NEW VANADIUM DEPOSIT

There is reported in the "Engineering and Mining Journal Press" of March 24th a new deposit of vanadium ore in Garfield County, Colorado, that promises to re-establish the production of vanadium on this continent, which was discontinued shortly after the Vanadium Corporation of America had effected a monopoly of the chief known supplies on this hemisphere. It is estimated that during the current year there will be produced from the new deposit 10,000 tons of ore containing 400 tons of vanadic acid. ( $V_2O_5$ ).

Brazil produces about \$3,000,000 annually in gold, most of it from mines of the St. John del Rey Mining Company, a British company.

Recent discoveries have brought Venezuela to the fore as an oil producer.



# CANADA'S MINERAL RESOURCES

MR. C. M. CAMPBELL, AGAIN URGES CAUTION  
IN ESTIMATES AND FORECASTS

To the Editor,

Canadian Mining Journal

Sir:

I have just returned to Canada after several months' absence. I had hoped when I left that this discussion was ended, but on looking over the back numbers of the "Journal" I find that it has been a live issue. Even at this late date it appears that another letter is in order.

Mr. Mickle's letter, in particular, has been featured both in this Journal and in the "Bulletin." Your editorial comment is that I have "undoubtedly fallen into a pit." Dr. Corless endorses it and "J. C. M." adjures me to answer it.

Mr. Mickle's claim is that the "positive" rule that governs the estimation of ore in a mine does not apply to areas like Cobalt and is "entirely illogical" when dealing with national mineral resources. "It is a fact," he says, "that by a collection of risks, risk can be eliminated," and he uses a raffle as an illustration. He states that if you buy all the tickets in a raffle you eliminate risk for you are sure to get the prize. That is true; but if you buy all the prospects in a mining district you do not necessarily buy even one solitary mine and you do not, therefore, eliminate risk. The fact that more money is put into many mining districts than is taken out is notorious. Also, should a man buy all the tickets at a raffle the prize he would get would seldom pay him for his trouble. It is too often the same with a mining district. I say again that any mining engineer that flirts with chance when estimating positive ore in a mine is making a big mistake. That is admitted by all. When he allows chance to figure in his estimate of positive ore in a district he is making what may be a much bigger mistake. That should be admitted by all. When we take a chance that national reserves are so great as to be inconceivable, the loss affects every Canadian, and the present strangling taxation for unnecessary railways is proof of this.

Furthermore there is no need to take these chances. When estimating the reserves of a mine we can make deductions and call them probabilities or possibilities as the case may be. We can do the same with Cobalt reserves or the national reserves. The present system is sufficiently elastic. Rules of chance should be barred and the danger sign put up when dealing with reserves which we state are facts.

Mr. Mickle thinks that in Cobalt, "where mines showed possibly more ounces in reserve than were estimated for the previous year, notwithstanding several million ounces were taken out in the meantime," the rules of the text books should not apply. He asks, "Should that experience, occurring persistently, be ignored?" As a matter of fact that experience has not occurred persistently in Cobalt or anywhere else. The statistics I have quoted in another letter show that the Cobalt production has dropped enormously in the very brief period of the last dozen years. That implies ultimate exhaustion rather than persistency and is an argument in favor of close adherence to text book rules rather than any deviation.

Mr. Mickle thinks that if my method of reasoning were followed we could count on the collection of a mining tax for a few years only; in other words that we are not sure of any mining industry after our present reserves are ex-

hausted. Mr. Mickle seems to have missed the point, as I will try to show.

Mr. F. H. Mason has published a letter in which he states I have spoiled some perfectly good paper by printing curves which give a false impression due to the inclusion of war time statistics. If it will be of any satisfaction to Mr. Mason we will cut out the war time period altogether. The figures will then show an agricultural production of about \$1,200,000,000 as against a mineral production of about \$200,000,000, or a ratio of 6 to 1. Dr. Corless has stated that this ratio will not only be evened up but that mining will be supreme. Dr. Corless speaks of the future as the time when this will come about. This is very indefinite. If his claim means anything at all it will have to be realized in the immediate future. The agricultural production is growing and if the slack, or most of it, is not taken up very shortly the ratio will soon be 12 to 1 or worse. Instead therefore of Mr. Mickle trying to prove that our present production is going to be maintained, which I admit is quite probable, it is up to him to show, by the rules of chance, where it is going to increase 600 per cent.

This means that instead of one Premier Mine there will be six and each will continue present production indefinitely and not merely work out a high-grade zone and then shut down, as was the case with the Dolly Varden. Instead of the Granby, Britannia and Consolidated operating in British Columbia there will be 18 companies of this type and it is presumed they will all pay adequate dividends regularly instead of once in a while as has been the case to date. Instead of the British Columbia coal output decreasing as has been the program for the past ten years, it is now going to increase 600 per cent. Either these things will have to come about soon or other mineral developments must take their place. There is no indication of this on any appreciable scale.

This program may be figured out for each province. In Mr. Mickle's province the non-metallic and structural material production is to be increased six times and the output marketed. Instead of having the largest gold mine in the world that proud province will have the six largest. There will be six Cobalts. The three large nickel companies, that have been mining out our nickel ore as fast as possible, will be reinforced by 15 more and the 70 millions of tons at Sudbury will be cleaned up in a short time. The fact that this is the only important nickel area that has been discovered in Canada in 40 years and the only deposit of its class that has been discovered in the entire world in all time does not worry Messrs. Corless and Mickle. It is quite possible, I admit, that other nickel bodies may be discovered in the pre-Cambrian, but if our nickel resources are to be cleaned up at the rate indicated, and that rate maintained, ordinary engineering and conservation rules demand that other nickel bodies should now be in an advanced state of development. I have dwelt on nickel as it is our outstanding mineral deposit. The same remarks apply, in a greater degree, to our other minerals.

This is not, therefore, a question as to whether or not we will continue plugging along at the present rate of production, with our ups and downs, and showing on the whole a slight increase. Dr. Corless did not consider this



in his telegram or address. He has not considered it since. He is dealing with the Inconceivable as a Fact; with a mineral production that will make mining Canada's greatest industry. The above gives some idea of the order of the increase needed just to equal the agricultural production as it now stands. The claims of Messrs. Corless and Mickle seem to me to be reduced to an absurdity.

Since my return I have also read two utterances from outstanding sources which show that Dr. Corless' statements of fact are being accepted at their face value by the Canadian people.

The annual report of the Canadian Bank of Commerce features Dr. Corless' claim that "85 per cent of Canada will find its greatest economic future in its minerals." Dr. Corless' figures are based on the inclusion of the entire pre-Cambrian. I have discussed this in the August "Bulletin" and it appears to me that this proposition is a gross exaggeration. The Survey publications state that the mineral wealth of the pre-Cambrian is virtually confined to the Huronian, Keewatin and Hastings-Grenville formations. In other words the Laurentian, consisting of granites and granite-gneisses, shown in pink on all geological maps, is not essentially a mineral-bearing formation; yet Dr. Corless says that in this area the "principal or only basic industry is or will be mining." This Laurentian produces a large amount of timber, fish and furs and should continue to do so indefinitely. It contains valuable water powers, and some day part of it may be the home of large numbers of reindeer as it is now the grazing ground of millions of caribou. It is the dominating formation in the pre-Cambrian as it covers well over a million square miles on the Canadian mainland along or over one-third of our entire area. Statements regarding its mineral resources have a vital bearing on the situation. If the pre-Cambrian were made up entirely of Huronian, Keewatin and Hastings-Grenville, Dr. Corless might have some excuse for the proportion he uses, but adulterated as it is with the huge area of Laurentian there is no excuse for the statement what ever.

The other utterance to which I referred is one made by Sir Henry Thornton in his recent addresses to the Canadian Clubs. As quoted in the press it is as follows: "There exists in the West a mineral development which in importance will in time fully equal, if not excel, the possibilities of agricultural development." This is obviously inspired by Dr. Corless' address. If Sir Henry takes "Inconceivable Wealth in Minerals" as one of the first principles of Canadian railroading he is not going to make a much better success of his work than his predecessors. If we were justified in saying that we had wealth of that character, there was no need to send to the mother country for Sir Henry.

I do not propose to deal at length with Dr. Corless' letter, as I have already had ample opportunity to set out my case. Dr. Corless considers the information given in my letters emphasizes the soundness of his reasoning. This is reminiscent of the letter in which he dealt with Mr. McDougall's address. "Our mineral wealth is not inexhaustible," said Mr. McDougall. "Canada contains inconceivable wealth in minerals," says Dr. Corless. These statements constituted the gist of two addresses. They dealt with exactly the same thing—our mineral resources. One president said they are not inexhaustible; the next says they are. Dr. Corless then proceeded to prove to his own satisfaction that these statements were in entire agreement. The futility of further argument in a case like this is obvious.

There is, however, one correction I wish to make. Dr. Corless states that my "greatest fallacy" is "in the unwarranted

assumption that since we cannot estimate our national mineral resources as we do the developed ore in a mine, we are not justified in making any inferences as to their extent." My reply to that is that we *can* and that is the only proper engineering method to employ. I have started above and I have stated in other letters that this does not prevent us from making inferences, but that it does prevent us from making inferences in the shape of probabilities and possibilities and stating them as facts. There are too many reduction plants in Canada that should never have been built, were built before their time or were built on too large a scale—all due to inferences that were not warranted. I have referred to the extravagant construction of railways as one product of an era when belief in Inconceivable Wealth was orthodox. That belief has been a curse to this Dominion, yet Messrs. Corless and Mickle are doing their best to keep it to the front. Dr. Corless' message, in which he set forth what he considered to be the vital facts, dealt with Inconceivable Mineral Wealth as a Fact; "literally so great," he says, "that it cannot be conceived or imaged by the mind." That is the form in which it went forth and that is the form in which it is being relayed to the public by our leading organizations.

In the August "Bulletin" I pointed out error after error that Dr. Corless has made, yet he still insists that the chance of our having this Inconceivable Mineral Wealth is so great that it should be stated as a "fact." That old adage, "Be sure you are right, then go ahead" he now wishes to change, insofar as district and national reserves are concerned, to "Take a chance, then go ahead." The time has not yet come, and never will come, to make such changes in the basic rules of the profession as Messrs. Corless and Mickle stand for.

Canadians, at different times in their history, when they realized the facts, have given a remarkable account of themselves. In some cases it has been heroic. I have an idea they can do the same again if they are only allowed to wake out of that opiated dream of Inconceivable Wealth into which they have been lulled.

C. M. CAMPBELL

Cassidy, B. C.

## LETTERS FROM READERS

### Mr. Rainville on Argonaut

To the Editor,

"Canadian Mining Journal."

Sir, Regarding your editorial on "Argonaut" in your 16th inst. issue, I would say that it was unfortunate particularly for the prestige of the "Canadian Mining Journal," that such an article should appear. It savors throughout of the "cross roads gossip" and general lack of up-to-date facts, which might have been expected from such a source, and apparently was carefully selected to suit your purpose. You say that "the long expected reorganization of the Argonaut, Limited, has been postponed once more." By whom, may I ask, was this reorganization expected outside of yourself and one or two other parties who are continually inclined to the pessimistic side of the industry? You say that "it is time the facts of the case were stated publicly." Was this not done at the meeting of shareholders held at the Windsor Hotel, on the 17th inst? At this meeting there were over 300 shareholders present, representing over 75 per cent. of the stock, and they heartily and unanim-



ously approved of every detail of the method of financing, which was more or less the subject of your criticism. Probably if you had kept your editorial out of print a few days longer, you would have had nothing to say except that "the presence of copper pyrite in the ore makes the extraction of gold difficult and expensive, and faulting and other irregularities in the ore-bodies has resulted in abnormally high mining cost." This latter has been the wail of a few alleged mining correspondents for some time. After careful experimentation based upon the practice of the metallurgy of other mills treating such ore, (it might be well for you to note here that there are mills in other parts of the world successfully treating gold associated with chalcopyrite), the results were very satisfactory showing about 92 per cent. of the gold capable of recovery at the plant in the form of gold bullion and the remainder, 4 or 5 per cent., concentrated with chalcopyrite. The cost of this latter operation is insignificant compared with the results obtained and is but quite a minor operation in an average flow-sheet. As to "the faulting and other irregularities in the ore bodies", etc., I would say that this is another phrase which is overworked by the self-styled mining correspondent without having a fact or figure to substantiate it. I might say that there is no faulting problem unsolved at Argonaut today and that mining costs should not be abnormal.

It is, indeed, unfortunate that you were so ill-advised and poorly informed in regard to the Huronia deal. The facts of this deal were made public on the 17th inst., and I might say that Argonaut is in a position today to reap the benefit of 75 per cent. of the net earnings resulting from operations on what was originally Huronia ground. Argonaut has acquired also 17 additional claims towards the north and north east of the present workings with the main ore-body striking across this ground, and also has over 800 acres in Rouyn Township, Que., in a most promising location and showing encouraging gold values.

I think that it is "high time that your bluff was called", as the mining industry of Canada is bound to suffer through you and your mining gossip-mongers. It would be advisable that in the future for you to ascertain a few facts at least, before going into print and thus guard yourself from ridicule and humiliation.

J. H. RAINVILLE.

Montreal, Que.

## A PROMISING NEW PROCESS

### Gold, Silver, Lead, and Copper by Volatilization

The publication of Bulletin 211, "The chloride volatilization process of ore treatment," by Thomas Varley, E. P. Barrett, C. C. Stevenson, and R. H. Bradford, is announced by the Bureau of Mines, Washington: It is obtainable on request.

Chloride volatilization is defined by the authors as the process of separating or isolating certain metals from worthless gangue or other minerals by means of alkali or alkaline earth halides, such as common salt and calcium chloride, which are added to the prepared ores in proper amounts, treated in a suitably designed furnace at temperatures high enough to form and to vaporize or volatilize the chlorides of the metals present.

The exact chemical reactions are not definitely known. Vaporous chlorides of certain metals in the ores are formed and are drawn away from the heated charge into properly provided containers, where they are recovered by some suitable means.

### Process Still Experimental

The art of treating ores by the chloride volatilization process is still in the experimental stage. The process has not been sufficiently developed along metallurgical lines to warrant a definite statement as to the exact place it will occupy in the industry. The basic theory of the process has received the attention of prominent metallurgists for 20 years, and much research and experimental work have been carried on.

If commercially utilized, the process will fill a long-felt want in metallurgy, especially in the treatment of oxidized and semioxidized or "carbonate" ores of copper, lead and silver. Such ores are difficult to treat by gravity concentration or by flotation; in the former their tendency to slime upon crushing and their being of lower specific gravity than the sulphide minerals cause serious losses; in the latter much has been done in sulphidizing oxidized ores and subsequently recovering the artificial sulphides by flotation. Difficulties in proper sulphidizing and the low recoveries obtained have not balanced the cost of the treatment in many plants and in very few has it proved successful.

Evidently there is a big void to fill in the treatment of these ores. No radical changes in present methods are forecast, but it is obvious that chloride volatilization can have a distinct place as a method of treatment for ores that are not readily amenable to present methods. In many plants it might replace concentration methods, especially where part of the material content in the ores exists in forms other than sulphides.

### Clean Separation of Lead and Zinc

In addition to the minerals named above, gold in ores has been readily volatilized. Zinc does not form a volatile chloride, if an oxidizing condition is maintained in the roasting operations. Some excellent results have been obtained with carbonate-zinc concentrates containing silver and lead. Practically all the silver and lead were volatilized, but very little of the zinc. Experiments have proved that the process is probably one of the best for making a clean-cut separation of lead and zinc.

Not much work has been done on sulphide ores, because the need is pressing for a volatilizing method for treating oxidized and carbonate ores. Experiments on sulphides have been, however, encouraging. When the sulphur content is above 5 per cent a preliminary roast is usually necessary before chloride roasting and volatilization.

The experiments described in this bulletin cover part of the investigations carried on by the United States Bureau of Mines, in coöperation with the department of metallurgical research of the University of Utah, on ores from all parts of the United States. Large quantities of different types of ores not amenable to any other process were available, and the method developed gives promise of great commercial importance. A chapter by Stuart Croasdale on the development of the volatilization process appears in the bulletin.



## THE USES OF TALC

The United States is at present producing approximately two-thirds of the world's supply of talc, a mineral that enters into the making of an astonishing number of every day articles, states the Bureau of Mines, Washington, which has completed a study of the technical problems involved in the mining and utilization of this material.

### Paper, Paints and Gas Tips

Probably the largest single use of talc is as a filler or loading material in paper, according to Raymond B. Ladoo, mineral technologist in charge of the investigation. The manufacture of newsprint consumes the largest quantities, but talc is used also successfully in many papers, from the cheapest to the finest grades. For use in paper, talc must be procurable at a price about equal to that of the best white clay; but paper makers could afford to pay slightly more if the talc is retained in paper better than is the clay.

Talc has been used for a number of years as a filler in the manufacture of mixed or ready-prepared paints. At first it was used secretively and was regarded as an adulterant; but gradually by actual tests and impartial research it was found that talc had valuable properties that really improved paints used for some purposes. To-day paint chemists regard talc as a paint material of great value.

Although the uses of talc and soapstone are many and varied, few of them are considered as essential in the sense that no substitutes can be used, but several are of great importance. Massive, close-grained talc, free from iron and grit, is cut into blanks and baked, forming the material used for gas tips and electrical insulation, commercially known as lava. The hardness of lava, its resistance to heat, acids, and alkalies, and its great dielectric strength make it very useful for electric insulation, and no satisfactory substitute for it has been found.

### Foundry Facing and Toilet Powder

The widest use of talc is in the powdered form. The value of ground talc depends upon color (whiteness), uniformity, fineness of grain, freedom from grit, "slip," and sometimes freedom from lime. White talc, free from grit and iron, and low in lime, ground to about 200-mesh, is used largely as a filler for paper, rubber, and paint. Ground talc and soapstone are used for foundry facings, either alone or mixed with graphite. A coarser grade of talc is used in the manufacture of asphalt-coated roofing felts and papers, both as a filler and as a surfacing.

The highest grade of ground talc is used as toilet powder, whiteness, fineness of grain, freedom from grit and lime, and a good "slip" being essential. Ground talc is also used in dressing and coating cloth, in making soap, rope, twine, pipe-covering compounds, heavy lubricants, and polishes. Massive varieties of talc, pyrophyllite, and high grades of soapstone are cut into slate pencils and steel-workers' crayons. French chalk or tailors' chalk is a soft, massive variety of talc. In China, Japan, and India, massive talc is carved into grotesque images and other forms and is often sold as imitation jade.

Talc is a hydrous magnesium silicate; it is often called steatite, soapstone, or potstone, and by the trade names talc clay, agalite, asbestine, and verdolite. The

term talc may be used to include all forms of the pure mineral, whereas steatite denotes particularly the massive, compact variety, and soapstone the impure, massive form that often contains only 50 per cent of talc. Talc ranges in color from pure white and silvery white through gray, green, apple green, gray green to dark green, also yellow, brown, or reddish when impure.

Talc and soapstone, with pyrophyllite — usually sold as talc — are widely distributed over the earth. Deposits are known in nearly every country, but production on a commercial scale has been confined mostly to the countries having highest industrial development. Of the total for the world, the United States produces about 65 per cent, France 13.4 per cent, Italy 7.4 per cent, Germany and Austria 5.4 per cent, and Canada 4.7 per cent. Vermont has the largest known talc reserves of any producing state, over 7,000,000 tons being reported from two companies.

### Transportation Facilities Important

As talc is a relatively low-priced commodity and its distribution throughout the world is general, transportation and distance from markets have influenced the location of new plants. The largest use of ground talc lies in the manufacture of paper, and its principal rival as a paper filler has been English clay. Most of the paper mills in the United States have been in New York and New England, and thus the talc deposits of New York and Vermont have been most fully developed because more easily able to compete with English clay brought into the ports of New York and Boston. In addition, the other industries that are large users of talc have been concentrated mostly in the northeastern States. The most important deposits of talc of toilet grade in the United States are in California, Washington, and possibly in North Carolina and Georgia.

In the South the remoteness of the deposits from railroads, the poor roads, the moderate size of the veins and the lack of capital for improving transportation, for adequate prospecting and development, and for building efficient mills of large capacity, as well as the distance from the markets for medium-grade tales, have prevented the growth of the industry. Deposits of talc of commercial grade are known in numerous Western states, but many of them are remote from transportation.

The results of these investigations are given in Bulletin 213, "Talc and soapstone; their mining, milling, products and uses," which may be obtained from the Bureau of Mines, Washington, D.C.

## AUTOMATIC TEMPERING OF STEEL

The O'Donovan furnace for tempering drill steel automatically is described briefly and illustrated in the "South African Mining and Engineering Journal" for February 10th. It has been developed at the East Rand Proprietary Mines, and it is expected that its operation will result in perfectly tempered steel. It is estimated that the hand tempering methods now in vogue result in 30 per cent of the steel sent underground being faulty in temper, and the new method of automatic tempering is expected not only to eliminate these faults but to save a large fraction of the present consumption of drill steel. Mr. O'Donovan's method is based upon the fact that steel becomes non-magnetic at a certain temperature, and that this temperature is also the exact point best for tempering.



# The Mining Districts

BY THE JOURNAL'S CORRESPONDENTS

## QUEBEC

**TRANSPORTATION TO NEW GOLD FIELD.**— Rouyn township will be made easy of access before May 15th. Such is the substance of a statement given by Mr. Téspélère Simard, the very active member for Temiscamingue in the Provincial Legislature.

Mr. Simard was in Quebec this week to plead before the Minister of Colonization, Mines and Fisheries, the case of the Quebec prospectors for better communications between Ville-Marie and the new gold discoveries in Rouyn township.

Mr. Simard, who spent the first two weeks of March in Rouyn township in the performance of his professional duty as a Land Surveyor, was very much pleased with the earnestness displayed by the different syndicates now prospecting in the district. Diamond-drilling by the Hammell-Bryce interests on the Robert Cockeram claims is going on actively. Six camps have been built during the winter by the Noranda Mines, Limited, on the Powell claims. Shaft sinking equipment is on the ground, and by April 1st. forty men will be engaged on development work.

The greatest handicap of the Rouyn camp to-day is inaccessibility. However, in view of the importance of the rush and of the development work already started, the Minister of Mines, Mr. Perrault, has expressed his eagerness to help the prospectors by all the means at his disposal. When Mr. Simard left Quebec after a busy week at the Parliament buildings, he had the assurance that the opening of two different routes will be assisted. One, an all-water route, will be ready immediately after the break-up on Lake des Quinzes; the second will be partly over land, making use of the 15-mile stretch of still water on Lake Opazatica.

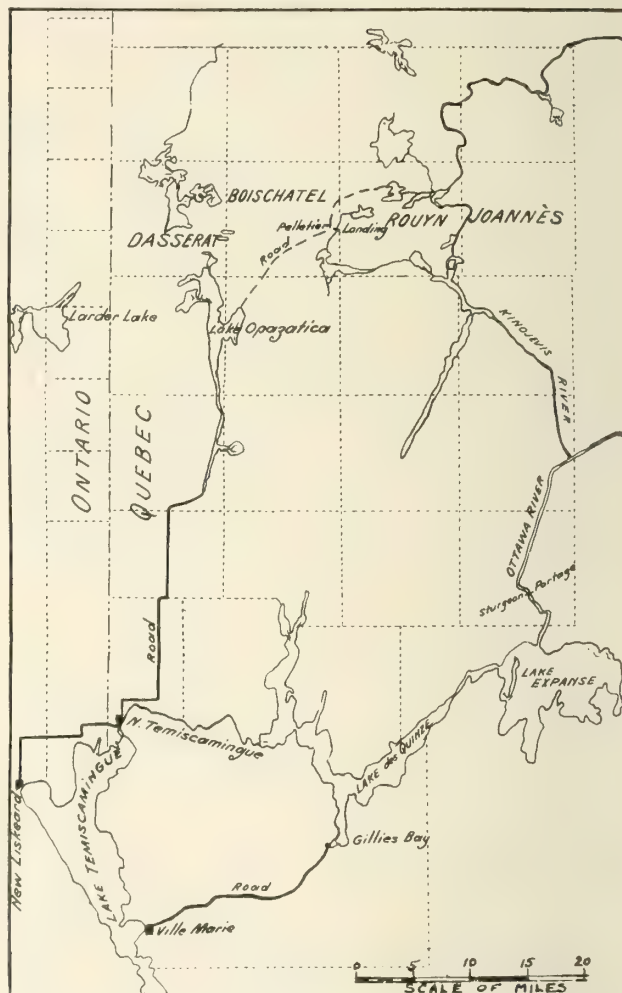
The Minister of Mines has made a grant to the Ville-Marie Navigation Company to organize a regular boat service from Gillies Bay to Boischatel, Rouyn and Joannès townships. It is expected that by May 15th a motor boat will be making regular trips. During the summer months supplies leaving Ville-Marie on motor trucks at six o'clock in the morning will be unloaded on Pelletier river by six o'clock in the evening, or twelve hours later.

From Ville-Marie as a starting point, one will journey to Gillies Depot, a distance of 24 miles over a good automobile road. From Gillies Bay a 65-foot motor-boat will carry passengers and freight over Lake des Quinze and Lake Expanse, to Sturgeon portage on the Ottawa river, the only stop of the whole journey. Above the portage a gasoline launch will take the load up the Ottawa river, the Kinojevis river, Lake Kinojevis, Lake La Bruyère, Lake Senezergues and up the Pelletier river as far as the rapids. The landing will be near the boundary line between Rouyn and Boischatel and will be near the center of the promising discoveries.

Besides the Ville-Marie Navigation Company, who will run a regular service, there will be other owners of motor boats who will make it a business to carry passengers and freight over the same route.

The second, or Lake Opazatica route, which eventually will be a permanent route, will be ready only by next fall, as a considerable amount of work has to be performed on it.

Starting from North Temiscamingue, sixteen miles from New Liskeard, the road through Nedelec township to Lake Opazatica, a distance of 23 miles will be reconstructed and made a first-class automobile road. The fifteen-mile stretch of water of Lake Opazatica will be made use of, and a motor boat will ply be-



tween the lower end of the lake and the northern extremity of East Bay. Thence a waggon road, seventeen miles long, will be cut through the bush in a north-eastern direction to the mining center of Rouyn township.

The Rouyn rush has not yet reached its peak and already 86,000 acres have been staked for mineral rights in that and adjoining townships. Requests for Prospector's Certificates at the Ville-Marie agency since January 1st, have come in larger number than at the head office in Quebec. In view of the large number of recorded claims that will follow, the Minister of Colonization, Mines and Fisheries has adopted the view of the men on the field, and a claim recording



office will be opened in Ville-Marie at a very early date. A competent officer from the Quebec office will take charge. This departure in the administration of the mining law of Quebec will be welcomed by the prospectors who since last fall have asked for such decentralization.

The organization of means for the fast transportation of men and supplies into the camp, and the establishment of a recorder's office at such an important town as Ville-Marie, shows that the Quebec Government is solicitous for the development of the mineral resources of the Province.

## NORTHERN ONTARIO

**BRANCH RAILWAYS ADVOCATED.**—The newspapers and mining interests of Northern Ontario are strongly advocating a branch line of the T. & N. O. Railway through the Kirkland Lake and Larder Lake field to the Quebec boundary, where a large amount of mining development is under way. In a recent issue of the "Northern Miner" it was pointed out that the extension of the T. & N. O. north of Cochrane is claimed to be partly for the purpose of serving a mining district. The "Northern Miner" map, however, shows that there are only eleven mining claims in good standing along the line of the northern extension, while there are thousands of claims and a large number of producing mines along the proposed Kirkland extension. The Ontario Government has not built a single mile of railway to serve the mining districts for over ten years, and the growth of the industry certainly demands more consideration. There is also a proposal to build a branch from Cobalt to South Lorrain, and this is a matter that warrants serious consideration on the part of the Government. South Lorrain has made remarkable strides during the past year and is now one of the important silver camps on this continent. During the first three months of 1923 the Mining Corporation property there will produce 500,000 ounces while the Keeley, shipments in March alone are expected to amount to 400,000 ounces. The president of the Mining Corporation, at the annual meeting of that Company, stated that they were very enthusiastic regarding the possibilities of the Frontier mine and that the engineers predicted a long life. It is hardly to be expected that production will be confined to the two properties above mentioned, and the district appears to have ahead of it many years of life as an important producing centre. At the present time in Cobalt there are several mills that will have shortly an excess capacity and it would seem an economic waste to duplicate these milling facilities in South Lorrain. If a railroad were to be built into South Lorrain and a freight rate of approximately \$1.00 a ton given on ore, it is probable that the greater part of the production in that district would go to Cobalt for treatment.

**LARDER LAKE.**—The Crown Reserve has cut a station at the 550-foot level of its shaft at Larder Lake (sometimes called the Pancake Lake property) and is now cross-cutting to the vein, which will be intercepted at a distance of about 275 feet from the shaft. Underground developments continue to confirm previous reports regarding widths and assays and further confidence is inspired by the results of the work on the Associated Goldfields property, only a short distance from the Crown Reserve line. The Company will fi-

nance future developments by the issue of additional stock, which was ratified at the recent shareholders' meeting, and it is understood that no attempt will be made to float a bond issue.

**COBALT.**—The annual report of the McKinley Dargagh shows a mining profit of \$103,035. The properties were only operated for six months of the year and the shut-down expenses were \$37,967, leaving a net profit of \$65,086. Production was 297,033 ounces. Cash assets stand at \$239,800. 20,000 tons are broken in the stopes and there is a considerable tonnage of unbroken ore to be mined. The tailing plant was not operated in 1922. Unless the price of silver declines it is anticipated that a fair profit can be obtained from operating the mill this year.

**ARGONAUT.**—Officials of the Argonaut have made a reply to some recent criticisms of that property that appeared in this journal. The property is under excellent management and from such information as can be obtained in that part of Ontario, appears to have good possibilities of being successful.

**NORTHWESTERN QUEBEC.**—R. H. Lyman, of Cobalt, has taken an option of 1500 acres in the new Quebec district on behalf of American associates. Sufficient finances have been arranged to permit of a thorough exploration of the properties and supplies have already been sent in. Other Cobalt companies are investigating the possibilities of the field, and it is expected that several of them will be active in Northern Quebec this year.

**PORCUPINE.**—The Goldale has decided to sink its shaft from the 500 to the 1000-foot level. Geologists seem to be of the opinion that the McIntyre section is covered by a lava cap, and that greater depth offers excellent possibilities. On the 500 ft. level a shoot of commercial ore was drifted on for a length of over 200 ft. with an average width of approximately 8 ft. To date the Kerr Lake has spent approximately \$100,000 on the property and it is expected that another \$75,000 will determine the commercial possibilities of the property.

Underground developments at the Peninsular continue favourable, and on the 425-foot level, 150 feet of drifting has shown an average of approximately \$13 for a width of 9 feet. It is understood that the company diamond-drilled about 1,000 feet away from the workings and picked up the continuation of the vein, which gave good values.

**COBALT DEVELOPMENTS.**—At the Ruby property in Cobalt, which is under option to the Coniagas, a long crosscut is being driven to explore the possibilities of the conglomerate underlying the diabase. In the month of February a total of 212 feet was driven in one heading, which is exceptionally fast work considering the limited number of men employed. La Rose and Colonial are continuing their shafts, the Colonial now being down over 930 feet, which must be very close to the contact. The La Rose shaft was down 475 feet on April 1st, making a footage of 125 feet for the month.

**MATACHEWAN.**—The Matachewan Canadian Gold Mines has been reorganized in order to take in several other properties. The capital is now \$5,000,000 of \$1.00 par and of this \$3,330,000 is paid for properties and services rendered, leaving \$1,670,000 shares in the treasury. The public will no doubt be asked to put up the money for this minority interest. Considerable work has been done on one of the properties and it is estimated that some ore has been developed, but the



These properties are understood to be practically unexplored and it is much too early to hold out any definite promise of having a commercial venture.

Senator G. D. Robertson, formerly Minister of Labour, is the president of the company and speaks very enthusiastically about it. It is unfortunate that members of the Government should lend themselves to promotions of this sort. The venture may be justified, but preparations are believed to be under way for a stock-selling campaign in which Senator Robertson's position in the Government will no doubt be used as a selling argument with unsophisticated investors. Senator Robertson, as Minister of Labour, was not remarkable for discretion, and his entry into the realms of mining finance is not likely to add to his prestige.

### BRITISH COLUMBIA

**SMITHERS.** — To acquire a prospect in July and six months later to have succeeded in carrying development to the point that the shipment of four cars of ore, 140 tons in all, is possible is something of an achievement. When it is known that this ore carried an average of 200 ounces of silver to the ton besides lead, it will be appreciated that these energetic and well directed efforts have not been in vain.

The property in question is the Henderson group, Hudson Bay Mountain, northern British Columbia; the man chiefly responsible for the results so far shown is J. F. Duthie, of Seattle; and the precise location of this development is 227 miles inland from the Pacific coast near the town of Smithers on the line of the Grand Trunk Pacific Railway.

Mr. Duthie and his associates control, besides the Henderson, the Mamie, Dome and Raven groups, all situated on the slope of Hudson Bay Mountain, which lies a few miles to the northwest of Smithers and rises to an altitude of some 8,500 feet.

The Mamie group, was developed first by drift tunnel and winzes. Its future will depend largely on a crosscut tunnel now being driven, upon which work was stopped when winter set in. A compressor and water wheel have been installed.

The opening up of the Henderson group, has been carried on steadily since last July. Surface work and drift tunnels have partly developed two veins, known as the "grey copper" and "ruby silver" veins. The latter has been exposed for about 500 feet by the lowest tunnel, which is in 700 feet. From this tunnel stoping has been started and it is expected that shipments can be maintained. It is planned that the "grey copper" vein shall be cross-cut and its products handled from this level.

The Henderson at present is equipped with two small portable gasoline-driven compressors which operate two stoping drills, one tripod drill and a pneumatic drill sharpener. It is understood that a 10-drill compressor will be taken in as soon as weather conditions permit.

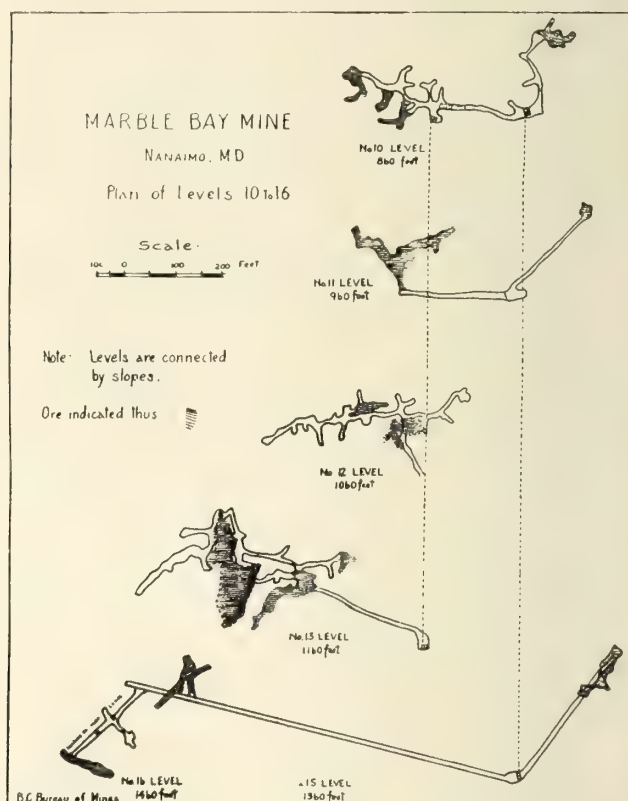
The continuance of the work on the Mamie, the opening up of a third vein on the Henderson, and the exploration of the Dome and Raven claims is proposed for this summer. To carry on these operations a considerable amount of new plant is to be purchased.

There is a good reason to believe that all this presages the establishment of a permanent and prosperous mining camp. In close proximity to the properties

mentioned is the Victory, which has been under development on a small scale for some years with encouraging results. In addition to the high-grade ore found on the two veins of the Henderson now being worked, there is a considerable amount of milling material. The owners, too, are satisfied that their work on the Mamie, Dome and Raven groups, which is to be conducted with vigor this year, will bring the reward sought.

**MARBLE BAY MINE.** — A report that the Anaconda Copper Company has purchased the Marble Bay Mine, Texada Island, British Columbia, although lacking official confirmation, has created a flurry of interest in provincial mining circles.

This mine was operated practically continuously from 1897 to 1920 producing some 10,000 tons a year. A large interest was held by the Tacoma Smelter Company, although there are understood to have been other major shareholders, among whom was the late H. W. Treat, a well known promoter and capitalist of Seattle.



In 1911 Herbert Carmichael, Provincial Assayer, reported that the main shaft had been sunk to the No. 10 level, 863 feet below the surface and that "from the bottom of the shaft drifts run both to the north and the south. On the northern drift, 160 feet from the main shaft, No. 2 Shaft has been sunk and is now within 6 feet of the No. 13 level, or a distance of 1,157 feet from the surface." Stoping and development work, he stated, were in progress in nearly all the levels, "the biggest stopes being on the No. 11 level, and the greatest amount of ore being taken out between No. 11 and 12 levels."

The ore is a mixture of bornite and copper pyrite in a felsite gangue. High-grade bornite was taken from the lowest level although it was thought in the earlier stages of development that it would give place to copper pyrite.

Mr. Carmichael continues: "The ore is found in a



light colored felsite, more particularly where the latter runs into the limestone country rock; ore also is found in pockets of actinolite and sometimes associated with garnetite, though as a rule where the latter is found there is no ore. There is little to guide the management in prospecting for new ore-bodies, as all the felsite shoots do not contain ore. A little ore may show up in a drift and may open out into a large and profitable ore-shoot while, again, a good showing may be blown out in a few shots. Diabase dykes occur all through the mine, but these appear to have been formed prior to the felsite dykes, as pieces of the former seem to have broken off and fallen into the felsite when it was formed, the diabase retaining all its angular corners.

"Taken in conjunction with the mineralogical conditions disclosed by recent work on the 'Little Billie' [a mine close to the Marble Bay,] there is increasing evidence to lead one to the belief that the felsite dykes carrying the ore solutions had their origin in the great granite flow noted on this part of the Coast, this rock being the most recent in the series, and that the basic materials were held in solution until they were precipitated where the felsite came in contact with limestone."

This gives a good idea of the property and the problem those directing its exploitation had to face and overcome. The values, however, were high and persistent, although not altogether consistent throughout the ore zone. Throughout the intervening years up to and including 1919 the Marble Bay Mine continued to be an important producer. Then the copper market sagged and, although the later underground development promised more of the same sort of ore-bodies that had in the past been so satisfactory in their yield, it was not thought to be economically sound to continue and operations ceased.

The last official report on the Marble Bay, written by Wm. M. Brewer, resident mining engineer in the 1918 report of the Minister of Mines, was optimistic in its tone. It says in part:

"The development work during 1918 has been confined almost entirely to opening up the 1600-foot level, which is about 1500 feet vertically below the surface and about 1400 feet below sea level. Diamond drilling has been done to explore the ground below the 1600-foot level on the westerly side of the incline winze from the 1500-foot level. These drill holes show large bodies of garnetite; one of these bodies is shown to be persistent for about 100 feet in a hole bored on a 26 degree angle from the floor of the 1600-foot level. The core also shows some narrow stringers of bornite in the garnetite."

The accompanying sketch shows how erratic the ore bodies have been in their occurrence and yet, Mr. Brewer observes, "when the formation is carefully studied there is a certain regularity and indications that, when followed, result in the discovery of extensions of the known ore-bodies or in finding new ones."

#### GOLD CLAIMS OPTIONED

James F. Flynn has secured an option on the Manley-O'Reilly claims in Skead township, northern Ontario, on which some spectacular showings of gold have been found. Mr. Flynn has let a contract for a shaft 100 feet deep, and as soon as weather permits will conduct surface exploration under his personal supervision.

#### NOVA SCOTIA

**WAGES INCREASED AT SYDNEY.**—On Wednesday, March 27th, a notice was posted at the Sydney Steel Works, granting a general increase to all classes of workers. The increase ranged from 10 to 14 p. c., the lower classes receiving 12 or 14 per cent, as required to bring them up to a living wage. This is in keeping with the statement made by President Wolvin some time ago, that "if orders were procured at better prices, the workmen would share from the beginning." The following statement was made by the Company: "The Management desires to point out that the Plant is being operated at a loss, and that a new scale of wages would substantially increase the loss. Since March 14th, some classes of the Company's products have been sold at better prices, and indications now are that conditions in the steel trade will continue to improve for some months to come.

"We realize the cost of living and the long period of partial employment in Sydney. On this account, and in the hope that we may as rapidly as possible fill the unprofitable orders now on our books, and thereafter be able to take new business at the better prices now prevailing, the Company is prepared to assume the additional loss, that a wage increase entails, and to put an increase into effect earlier than trade conditions actually warrant.

"Special consideration has been shown to such ordinary labor rates as are now below thirty cents. These classes will be increased 12 to 14 p.c."

Just what action will be taken by the workmen is not in much doubt of the labor leaders, under the stimulus of the Workers' Party of Canada, are to be taken seriously. The inflammatory, offensive and threatening speeches made by these men in Sydney during the last six months bore fruits of their kind in February last, and are sure to have greater and worse results when a genuine issue is at stake. Were the steel workers of Sydney left to their own opinions, they would gladly accept the offer of the Company and would trust them to give further help in the future when business improves. But the Workers' Party have stated that their policy is to take advantage of all such situations to advance their cause, and where conditions are favorable to strengthen themselves that they may ride rough-shod into power.

**BOARD OF TRADE'S STAND.**—The business public of Sydney are fully alive to the seriousness of the situation, and the Board of Trade has taken a stand in the matter. After first resolving to stand together for law and order, they then appealed to the Governments to help the right thinking people of Cape Breton to wipe out Bolshevism. Should rioting begin with a strike, it is their intention to step into the gap and hold the fort until relief arrives. Some such heroic stand is most necessary, and the Board of Trade seems to think that it is the proper body to take it. In the election that took place a few weeks ago, the Reds were swept from the council board, and the Moderate candidates were put in control of the administration of the city. The authority is now in their hands, and they are called upon to enforce the law and assert the rights of the people. The workmen will have the right to strike, but not the right to keep others from going to work who want to do so.

Private property will be protected, and the liberty of every Canadian citizen safeguarded. For long the



and industry has languished on an ebb tide, and now that the flood has set in the citizens of Sydney will conduct their affairs in such a way that it will lead to fortune rather than to misery. In this they will be loyally supported by the general public of Canada.

**TIME-OUT FOR THE REDS.**—The coal industry of Nova Scotia, through the effect of the long strike in the United States, has prospered during the last six months. Steady employment at good wages has been general in the collieries. Very little complaint was heard. To all appearances the miners had got down to work with a will, and it was beginning to be generally felt that peace and prosperity were again walking hand in hand. But just as soon as the steel workers issued their ultimatum recently, special Sunday meetings were called at the collieries, and grievances unknown and unheard of were publicly aired. Many of the complaints were ridiculous.

It was noticeable that at some of these meetings, the editor of the "Labor Herald" and James B. McLaughlin were present, and from the suddenness of the outbreak it is apparent that the agents of the "Workers' Party" had been active in each local. The policy of this party is to interrupt industry, and by means of the uncertainty of business to break down the present industrial system. The main purpose at present is to worry and irritate the Company while the pending steel strike is on, and force their hands and at the same time advance the cause of the Reds. They may succeed better than they anticipate, for such continuous interference may bring about a cessation of all the Company's industrial activities.

**THE NOVA SCOTIA COAL TRADE.**—The remaining months of this year should witness great activity in the coal trade of Nova Scotia. A considerable amount of coal has been sold in the New England States this winter; but when the Americans catch up with the demand of their own coal trade, this territory is not likely to be open again for our coal for many years. The large outputs of American mines in normal times more than supply their own trade and the overflow will undoubtedly find its way into Canadian markets, thus competing with Nova Scotia coal. The present prosperity is not, therefore, due to any increased demand in the Canadian market, but to a scarcity in the markets of our neighbors. Those who know the coal trade view with more or less anxiety the competition to be faced in the near future. Formerly wage agreements provided stability in the coal industry, but of late public confidence has been rudely shaken in any contract entered into between the District No. 26 and the Dominion Coal Company.

**EMPLOYMENT GOOD.**—A feature that both the steel and coal workers fail to see is the general state of employment now prevailing in Cape Breton in both the steel and coal trades. This is all the more remarkable when compared with conditions in other industrial centres of the province. Perhaps there is no part of Canada just now where employment conditions are so favorable. There is no unemployment at the collieries and except for some idle time in the Sydney Mines district at one or two collieries owing to car shortage, miners are well employed. Sydney is almost in the same favorable condition. Statements have been sent broadcast over Canada and to Great Britain that labor is scarce and many men are out of work. There is little truth in such vaporings. They are made for the purpose of prejudicing the public mind against the British Empire Steel Corporation. Hundreds of out-

side men have found employment at the collieries since last fall and are well satisfied with the conditions.

**HEARING OF STEEL WORKERS' COMPLAINTS.**—Mr. E. McG. Quirk, representing the Federal Labor Department, spent a few days in the Sydney district, gathering information on the labor situation. He met officers and delegates of the steel and coal labor organizations and discussed conditions with them. The steel workers were very outspoken and made no attempt to conceal their case and their intentions from Mr. Quirk. When the statement was made that the steel workers were not organized, and could not enforce their demands, Mr. Quirk was openly told that if proof were necessary, a two hours' demonstration would be given by calling out the workers of any department of the steel works he wished to name. The temper shown by the men of the steel plant is determined. They believe they can win a strike within a week by withdrawing the maintenance men. They are not ignorant of the fact, however, that if the strike drags on and the company are able to keep the coke-ovens and the blast-furnaces warm, they stand to lose a strike. Should they succeed in keeping men away from the coke-ovens until these cool off, they will lose in any case. It cost \$2,000,000 to build the ovens and it took one year to complete the work. Capital has lost all confidence in the workers of the coal and steel industry of Cape Breton, and it might be many years before it could be induced to venture back again.

On account of the information, thus openly given to Mr. Quirk, it may be that the stated object of the strikers in trying to render the property of the Company useless will be frustrated. It is known now that steps have already been taken to safeguard property and to keep the blast-furnaces and the coke-ovens warm in the event of a strike.

## POSITIONS OPEN AT OTTAWA

The following positions have been announced as open for application until April 19th by the Secretary, Civil Service Commission, Ottawa. Application forms can be had from the Secretary, from any office of the Employment Service, or from post-offices in the principal cities.

**5149** — An Assistant Geologist, Geological Survey, at an initial salary of \$2,100 with annual increase of \$120, and in addition whatever bonus may be granted by law. The duties are general geological mapping and similar work. The qualifications include graduation and two years post-graduate work in geology and mineralogy, and two years of field training.

**5150** — An Editor, grade 1, Editorial Division, Department of Mines, at an initial salary of \$1,800 with annual increase of \$120, and bonus as provided by law. The duties are to edit, under instruction, the publications of the department. The requirements include graduation from a university or its equivalent, two years' experience in editing work, and a general knowledge of the technical operations conducted by the Department of Mines.

South Africa has produced to date £1,053,000,000 in mineral wealth. Three quarters of this, or £748,000,000, was contributed by gold, and £222,250,000 by diamonds. More than 90 percent of this gold has come from the Witwatersrand.



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Full information as to treatment charges, schedule of payments, etc., can be obtained from the undersigned, or from A. A. Cole, Manager, Timiskaming Testing Laboratories, Cobalt, Ontario.

THOS. W. GIBSON,  
Deputy Minister of Mines.

Toronto, 12th March, 1923.

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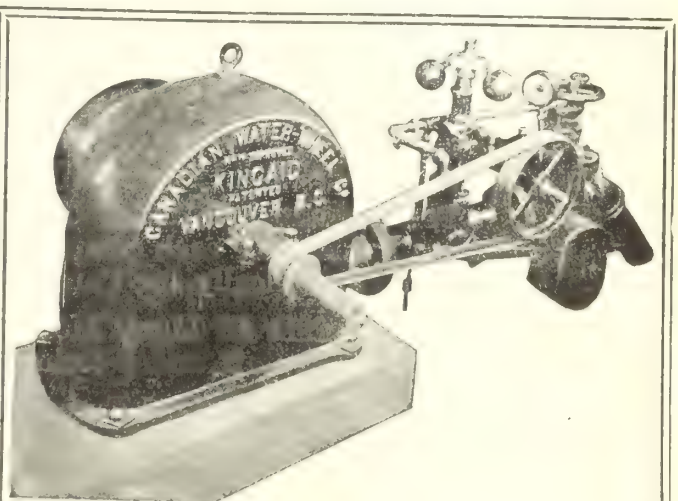
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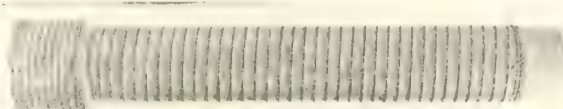
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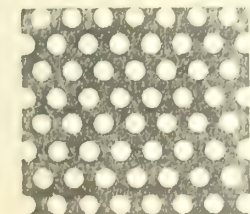
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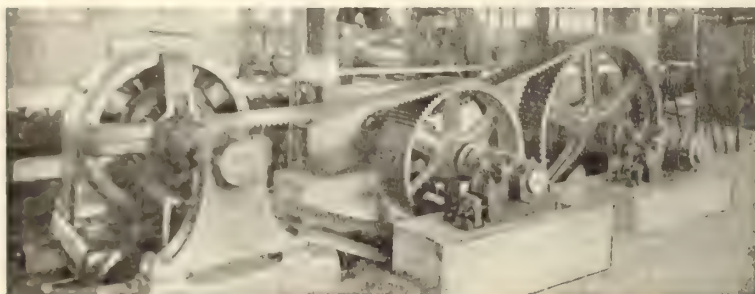
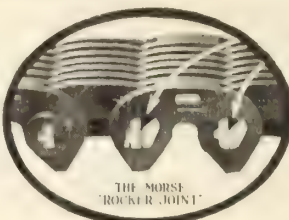
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"Leather belts lasted us 2 to 3 years at the most, while our Morse Chain Drives have already lasted 3 to 4 times that long and seem good for many more years. So Morse Drives have cut our expense materially, speeded up production, cut out overtime wages and saved floor space, for they operate on shorter centers."

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Holman Bros., Ltd.  
Hull Iron & Steel Foundries, Ltd.  
Peacock Brothers, Limited.  
The William Kennedy & Sons, Ltd.
- Cement Machinery:**  
Hadfields, Limited.  
Hull Iron & Steel Foundries, Ltd.  
The William Kennedy & Sons, Ltd.
- Chains:**  
Jones & Glassco, Reg.  
Canadian Link-Belt Co., Ltd.  
Greening, B., Wire Co., Ltd.
- Chain Drives:**  
Jones & Glassco (Regd.).
- Chain Drives—Silent and Steel Roller:**  
Canadian Link-Belt Co., Ltd.  
Hans Renold of Can., Ltd.  
Jones & Glassco (Regd.).
- Chemist:**  
Thos. Heyes & Sons.  
Milton Hersey Co.  
Ledoux & Co.
- Chrome Ore:**  
Everitt & Co.
- Crusher Jaws:**  
Canadian Steel Foundries, Ltd.  
The William Kennedy & Sons, Ltd.
- Crushing Rolls:**  
Canadian Steel Foundries, Ltd.  
The William Kennedy & Sons, Ltd.
- Classifiers:**  
The Dorr Company
- Clutches:**  
Canadian Link-Belt Co., Ltd.  
Hans Renold of Can., Ltd.
- Coal:**  
Dominion Coal Co.  
Nova Scotia Steel & Coal Co.
- Coal Cutters:**  
Sullivan Machinery Co.  
Canadian Ingersoll-Rand Co., Ltd.  
Herbert, Alfred, Limited  
Holman Bros., Ltd.  
Peacock Brothers, Limited
- Coal Crushers:**  
Canadian Link-Belt Co., Ltd.  
Peacock Brothers, Limited.
- Coal Mining Machinery:**  
Canadian Ingersoll-Rand Co., Ltd.  
Canadian Rock Drill Co.  
Denver Rock Drill Mfg. Co., Ltd.  
Sullivan Machinery Co.  
Hadfields, Limited.  
Hendrick Mfg. Co.  
Herbert, Alfred, Limited  
Holman Bros., Ltd.



**Pipes:**

Consolidated Mining &amp; Smelting Co.

**Coal and Coke Handling Machinery:**  
Canadian Link-Belt Co. Ltd.**Coal Pick Machines:**Canadian Ingersoll-Rand Co. Ltd.  
Herbert, Alfred, Limited  
Holman Bros., Ltd.  
Sullivan Machinery Co.**Forges:**Canadian Steel Foundries, Ltd.  
Hull Iron & Steel Foundries.  
John J. Gartshore.**Furnaces—Assay:**Lymans, Limited  
Mine & Smelter Supply Co.**Gasoline Engines:**Belliss & Morcom, Ltd.  
Laurie & Lamb**Gasoline Extraction Compressors:**Canadian Ingersoll-Rand Co. Ltd.  
Sullivan Machinery Co.**Gasoline Tanks:**Can. Chicago Bridge & Iron Co., Ltd.  
Horton Steel Works, Ltd.**Gaskets:**

Gutta Percha &amp; Rubber, Ltd.

**Gears:**Hans Renold of Canada, Ltd.  
Jones & Glassco, Regd.  
The William Kennedy & Sons, Ltd.**Gears (Cast):**Canadian Link-Belt Co., Ltd.  
Hull Iron & Steel Foundries, Ltd.  
The William Kennedy & Sons, Ltd.**Gears, Machine Cut:**The Hamilton Gear & Machine Co.  
The William Kennedy & Sons, Ltd.**Gold Refiners:**

Goldsmith Bros.

**Gold Trays:**Can. Chi. Bridge & Iron Works, Ltd.  
Horton Steel Works, Ltd.**Grab-Buckets:**

Canadian Mead-Morrison Co.

**Hand Cars:**

Sylvester Mfg. Co., Ltd.

**Hose:**Goodyear Tire & Rubber Co.  
Gutta Percha & Rubber, Ltd.  
Dunlop Tire & Rubber Co.**Hammer Rock Drills:**Canadian Ingersoll-Rand Co., Ltd.  
Canadian Rock Drill Co.  
Denver Rock Drill Mfg. Co., Ltd.  
Herbert, Alfred, Ltd.  
Sullivan Machinery Co.**Hangers and Cables:**

Stan. Underground Cable Co., Ltd.

**Heating Systems:**

Canadian Sirocco Co., Ltd.

**High Speed Steel:**

Hadfields, Ltd.

**Hoists—Air, Electric and Steam:**Canadian Ingersoll-Rand Co., Ltd.  
Canadian Rock Drill Co.  
Denver Rock Drill Mfg. Co., Ltd.  
Herbert, Alfred, Ltd.  
Holman Bros., Ltd.  
Jones & Glassco, Regd.  
Mine & Smelter Supply Co.  
Canadian Link-Belt Co., Ltd.  
Peacock Bros., Ltd.  
Sullivan Machinery Co.**Hoisting Towers:**

Canadian Mead-Morrison Co.

**Hose:**

Gutta Percha &amp; Rubber, Ltd.

**Hydraulic Machinery:**Hadfields, Ltd.  
Belliss & Morcom, Ltd.  
Laurie & Lamb.  
The William Kennedy & Sons, Ltd.**Oil Storage Tanks:**Can. Chicago Bridge & Iron Co., Ltd.  
Horton Steel Works, Ltd.  
The Toronto Iron Works, Ltd.**Industrial Chemists:**

Hersey, M. &amp; Co., Ltd.

**Insulating Compounds:**

Stan. Underground Cable Co.

**Inspectors:**

Hersey, M. &amp; Co., Ltd.

**Jacks:**

Northern Canada Supply Co.

**Jaw & Gyratory Crushers:**Herbert, Alfred, Limited.  
Holman Bros., Ltd.**Lamps — Carbide:**

Dewar Manufacturing Co., Inc.

**Lamp-Miners:**Dewar Manufacturing Co., Inc.  
Northern Electric Co.  
Peacock Bros., Ltd.**Lead (Pig):**

Consolidated Mining &amp; Smelting Co.

**Levels:**

C. L. Berger &amp; Sons.

**Light & Heavy Steel Plate Construction:**Hendrick Mfg. Co.  
The William Kennedy & Sons, Ltd.**Locomotives (Steam, Compressed Air and Storage):**Canadian Ingersoll-Rand Co., Ltd.  
Laurie & Lamb.**Link Belt:**Canadian Link-Belt Co., Ltd.  
Northern Canada Supply Co.  
Jones & Glassco, Regd.**Machine Guards:**

Greening, B. Wire Co., Ltd.

**Magnesium Metal:**Everitt & Co.  
Hull Iron & Steel Foundries, Ltd.**Manganese Steel:**Hadfields, Ltd.  
Hull Iron & Steel Foundries, Ltd.**Manganese-Steel Trackworks:**

Canadian Steel Foundries, Ltd.

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C. L. Constant Co.  
Everitt & Co.**Metallurgical Engineers:**

The Dorr Co.

**Metallurgical Machinery:**Dwight & Lloyd Sintering Co.  
The Dorr Co.  
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The William Kennedy & Sons, Ltd.**Mica:**

Everitt &amp; Co.

**Mine Cars:**Canadian Steel Foundries, Ltd.  
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Hadfields, Limited.

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Hadfields, Limited.  
Hull Iron & Steel Foundries, Ltd.**Mining Ropes:**Dominion Wire Rope Co., Ltd.  
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**Molybdenite:**

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Peacock Brothers, Ltd.

**Nickel:**

The Mond Nickel Co., Ltd.

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Canadian Mead-Morrison Co.  
Herbert, Alfred, Limited.**Ore Sacks:**

Northern Canada Supply Co.

**Ore Testing Works:**Ledoux & Co.  
Can. Laboratories.  
Hoyt Metal Co.**Ores & Metals—Buyers & Sellers of:**Geo. G. Blackwell.  
Consolidated Mining & Smelting Co.  
Everitt & Co.**Oils:**

Hercules Powder Co.

**Pavers:**Wettlaufers Brothers.  
Gutta Percha & Rubber, Ltd.  
Laurie & Lamb.**Perforated Metals:**Hendrick Mfg. Co.  
Canada Wire & Iron Goods Co.  
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Holman Bros., Ltd.**Plate Works:**Can. Chi. Bridge & Iron Co., Ltd.  
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Sullivan Machinery Co.**Pumps—Steam:**Canadian Ingersoll-Rand Co., Ltd.  
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Laurie & Lamb.  
Peacock Brothers, Limited.  
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The William Kennedy & Sons, Ltd.**Pumps—Electric:**Canadian Ingersoll-Rand Co., Ltd.  
Laurie & Lamb.**Peacock Brothers, Ltd.**

Smart-Turner Machine Co.

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Sylvester Mfg. Co.

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Holman Bros., Ltd.  
Sullivan Machinery Co.



- Balls:**  
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The William Kennedy & Sons, Ltd.  
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Jones & Glassco, Regd.
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- Rolls—Crushing:**  
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Hendrick Mfg. Co.  
Canada Wire & Iron Goods Co.
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Hendrick Mfg. Co.
- Screens—Perforated Metal:**  
Hendrick Mfg. Co.
- Screens—Shaking:**  
Canadian Link-Belt Co., Ltd.  
Hendrick Mfg. Co.
- Screens—Revolving:**  
Canadian Link-Belt Co., Ltd.  
Hendrick Mfg. Co.  
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Mine & Smelter Supply Co.
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Wettlaufer Bros.
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Hendrick Mfg. Co.
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Hendrick Mfg. Co.
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Peacock Brothers, Ltd.  
The William Kennedy & Sons, Ltd.
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Canadian Mead-Morrison Co.
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Canadian Link-Belt Co., Ltd.  
Hans Renold of Canada, Ltd.  
Jones & Glassco, Regd.
- Silent and Steel Roller:**  
Canadian Link-Belt Co., Ltd.  
Jones & Glassco, Regd.
- Saline Refiners:**  
Goldsmith Brothers.
- Smelters:**  
Goldsmith Bros.
- Sledges:**  
Canada Foundries & Forgings.
- Sintering:**  
Dwight & Lloyd Sintering Co., Inc.
- Smoke Stacks:**  
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Hendrick Mfg. Co.  
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Consolidated Mining & Smelting Co.
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- Canada Link-Belt Co., Ltd.**  
Jones & Glassco, Regd.  
The William Kennedy & Sons, Ltd.
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- Steel Castings:**  
Canadian Steel Foundries, Ltd.  
Canadian Brakeshoe Co., Ltd.  
Hull Iron & Steel Foundries, Ltd.  
Hadfields, Ltd.  
The William Kennedy & Sons, Ltd.
- Steel Drills:**  
Canadian Rock Drill Co.  
Denver Rock Drill Mfg. Co., Ltd.  
Sullivan Machinery Co.  
Peacock Brothers, Ltd.  
Canadian Ingersoll-Rand Co., Ltd.
- Steam Hoisting Engines:**  
Canadian Mead-Morrison Co.
- Steam Engines:**  
Belliss & Morcom, Ltd.  
Laurie & Lamb.
- Steam Traps:**  
Canadian Sirocco Co., Ltd.  
Laurie & Lamb.
- Steel Drums:**  
Smart-Turner Machine Co.
- Steel Tool:**  
N. S. Steel & Coal Co.  
Hadfields, Limited.
- Structural Steel Work—Light:**  
Hendrick Mfg. Co.  
The William Kennedy & Sons, Ltd.
- Stone Breakers:**  
Holman Bros., Ltd.  
Canadian Ingersoll-Rand Co., Ltd.  
Denver Rock Drill Mfg. Co.  
Herbert, Alfred, Limited.
- Stone Quarrying Machinery:**  
Canadian Ingersoll-Rand Co., Ltd.  
Denver Rock Drill Mfg. Co.  
Sullivan Machinery Co.
- Sulphate of Copper:**  
The Mond Nickel Co., Ltd.
- Surveying Instruments:**  
C. L. Berger.
- Switches:**  
Canadian Steel Foundries, Ltd.
- Switches and Turntables:**  
John J. Gartshore.
- Tables—Concentrating:**  
Mine & Smelter Supply Co.
- Tanks:**  
Can. Chicago Bridge & Iron Co., Ltd.  
Horton Steel Works, Ltd.
- Tanks—Acid:**  
Can. Chicago Bridge & Iron Co., Ltd.  
Horton Steel Works, Ltd.  
Ontario Wind Engine & Pump Co.
- Tanks—Wooden:**  
Gould, Shapley & Muir Co., Ltd.  
Ontario Wind Engine & Pump Co.  
Pacific Coast Pipe Co., Ltd.  
Mine & Smelter Supply Co.
- Tanks, Cyanide, Etc.:**  
Can. Chicago Bridge & Iron Co., Ltd.  
Horton Steel Works, Ltd.  
Hendrick Mfg. Co.  
Ontario Wind Engine & Pump Co.  
Pacific Coast Pipe Co.
- Tanks—Steel:**  
Canadian Ingersoll-Rand Co., Ltd.  
Can. Chicago Bridge & Iron Co., Ltd.  
Horton Steel Works, Ltd.  
Hendrick Mfg. Co.  
The William Kennedy & Sons, Ltd.
- Tanks—Oil Storage:**  
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Horton Steel Works, Ltd.
- Tanks—Water & Steel Towers:**  
Can. Chicago Bridge & Iron Co., Ltd.  
Horton Steel Works, Ltd.  
Ontario Wind Engine & Pump Co. Ltd.
- Tires—Auto, Truck and Bicycle:**  
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Gutta Percha & Rubber, Ltd.  
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Sylvester Mfg. Co., Ltd.
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- Transformers:**  
Northern Electric Co., Ltd.
- Transmission Appliances:**  
Jones & Glassco, Regd.
- Transmission Machinery:**  
Canadian Link-Belt Co., Ltd.  
Hans Renold of Canada, Ltd.  
Jones & Glassco, Regd.  
The William Kennedy & Sons, Ltd.
- Troughs (Conveyor):**  
Hendrick Mfg. Co.
- Trucks:**  
Hammant Steel Car & Eng. Works
- Tubs**  
Hadfields, Limited.
- Tube Mills:**  
Canada Foundries & Forgings, Ltd.  
Herbert, Alfred, Limited.  
Holman Bros., Ltd.  
The William Kennedy & Sons, Ltd.  
Mine & Smelter Supply.
- Tube Mill Balls:**  
Canada Foundries & Forgings, Ltd.  
Herbert, Alfred, Limited.  
Holman Bros., Ltd.  
Hull Iron & Steel Foundries, Ltd.  
Peacock Brothers, Ltd.  
The William Kennedy & Sons, Ltd.
- Turbines:**  
Belliss & Morcom, Ltd.  
Laurie & Lamb.
- Tube Mill Liners:**  
Herbert, Alfred, Limited.  
Hull Iron & Steel Foundries, Ltd.  
Peacock Brothers, Ltd.  
The William Kennedy & Sons, Ltd.
- Turbines—Waterwheel:**  
The William Kennedy & Sons, Ltd.
- Turbo Blowers & Compressors:**  
Canadian Ingersoll-Rand Co., Ltd.
- Turbines—Steam:**  
Laurie & Lamb.
- Uranium:**  
Everitt & Co.
- Vacuum Pumps:**  
Laurie & Lamb.  
Sullivan Machinery Co.
- Vises:**  
Philip Gies Foundry.  
The William Kennedy & Sons, Ltd.
- Ventilating Systems:**  
Canadian Sirocco Co., Ltd.
- Water Jet Drifting Drill:**  
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- Welding—Rod & Flux:**  
Frest-O-Lite Co. of Canada, Ltd.
- Wheels and Axles:**  
Hadfields, Limited.  
The William Kennedy & Sons, Ltd.
- Winches—Power Driven:**  
Canadian Mead-Morrison Co.
- Winding Engines—Steam & Electric:**  
Canadian Ingersoll-Rand Co., Ltd.  
Herbert, Alfred, Limited.  
Holman Bros., Ltd.
- Wire**  
Anglo-Canadian Wire Rope.  
Canada Wire & Cable Co., Ltd.  
Greening, B. Wire Co.
- Wire (Bare and Insulated):**  
Canada Wire & Cable Co., Ltd.
- Wire Rope:**  
Allan, Whyte & Co., Ltd.  
Anglo Canadian Wire Rope.  
Canada Wire & Iron Goods Co.  
Dominion Wire Rope Co., Ltd.  
Greening, B. Wire Co.  
Standard Underground Cable Co. of Canada, Limited.  
Northern Electric Co., Ltd.
- Wire Rope Fittings:**  
Anglo Canadian Wire Rope.  
Canada Wire & Iron Goods Co.
- Wire Cloth:**  
Greening, B. Wire Co.  
Canada Wire & Iron Goods Co.
- Wire Chains:**  
Greening, B. Wire Co.
- Wolfram Ore:**  
Everitt & Co.
- Zirconium:**  
Everitt & Co.
- Zinc:**  
Consolidated Mining & Smelting Co.  
Greening B. Wire Co.



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American Canadian Wire Co.  
American Zinc, Lead & Smelting Co., Ltd.

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Canada Foundries & Forgings, Ltd.  
Canadian Mead-Morrison Co., Ltd.  
Canadian Vickers, Ltd.  
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Canadian Water Wheel Co., Ltd.  
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Canadian Rock Drill Co., Ltd.  
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Crude Oil Engine Co. of Canada

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Deloro Smelting & Refining Co., Ltd.  
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Dominion Wire Rope Co., The  
Dominion Oxygen Co., Ltd.  
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Ridout & Maybee

## S

Sylvester Mfg. Co., Ltd.  
Smart-Turner Machine Co.  
Smith & Travers Co., Ltd.  
Standard Underground Cable Co. of Canada, Ltd.  
Stewart, Robert H.  
Sudbury Diamond Drilling Co., Ltd.  
Sullivan Machinery Co.

## T

Tyrrell, J. R.

## W

Whitman, Alfred R.  
Wilson, R. W.

## The Consolidated Mining and Smelting Company

OF CANADA, LIMITED

Smelting and Refining : TRAIL, BRITISH COLUMBIA

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GOLD, SILVER, COPPER, LEAD and ZINC ORES

Producers and Sellers of

Copper - Lead - Zinc

Tadanac Brand

General Sales Offices - Drummond Building, Montreal

CARBIDE



LAMPS

DEWAR MANUFACTURING COMPANY

358 COLLEGE ST.

TORONTO ONTARIO



# PROVINCE OF QUEBEC

## MINES BRANCH

Department of Colonization, Mines and Fisheries

The chief minerals of the Province of Quebec are Asbestos, Chromite, Copper, Iron, Gold, Molybdenite, Phosphate, Mica, Graphite, Ornamental and Building Stone, Clays, etc.

### MINISTER OF COLONIZATION, MINES AND FISHERIES, QUEBEC

**MINER'S CERTIFICATES.** First of all, obtain a miner's certificate, from the Department in Quebec or from the nearest agent. The price of this certificate is \$10 and is valid until the first of January following. This certificate gives the right to prospect on public lands and on private lands, on which the mineral rights belong to the Crown.

The holder of the certificate may stake mining claims to the extent of 200 acres.

**WORKING CONDITIONS.** During the first six months following the staking of the claim, work on it must be performed to the extent of at least twenty-five days of eight hours.

**SIX MONTHS AFTER STAKING.** At the expiration of six months from the date of the staking, the prospector, to retain his rights, must take out a mining license.

**MINING LICENSE.** The mining license may cover 40 to 200 acres in unsurveyed territory. The price of this license is Fifty Cents an acre per year, and a fee of \$10.00 on issue. It is valid for one year and is renewable on the same terms, on producing an affidavit that during the year work has been performed to the extent of at least twenty-five days' labour on each forty acres.

**MINING CONCESSION.** Notwithstanding the above, a mining concession may be acquired at any time at the rate of \$5 an acre for SUPERIOR METALS, and \$3 an acre for INFERIOR MINERALS.

The attention of prospectors is especially called to the territory in the North-Western part of the Province of Quebec north of the height of land, where important mineralized belts are known to exist.

**PROVINCIAL LABORATORY.** Special arrangements have been made with POLYTECHNIC SCHOOL of LAVAL UNIVERSITY, 228 ST. DENIS STREET, Montreal, for the determination, assays and analysis of minerals at very reduced rates for the benefit of miners and prospectors in the Province of Quebec. The well equipped laboratories of this institution and its trained chemists ensure results of undoubted integrity and reliability.

The bureau of Mines at Quebec will give all the information desired in connection with the application for mining concessions of the Province, on application addressed to

**HONORABLE J. E. PERRAULT,**

The Mining Law gives absolute security of Title and is very favourable to the Prospector.

# BRITISH COLUMBIA

## The Mineral Province of Western Canada

Has produced Minerals valued as follows Placer Gold, \$76,542,203; Lode Gold, \$109,647,661; Silver, \$59,814,266; Lead, \$51,810,891; Copper, \$170,723,242; Zinc, \$24,625,839; Coal and Coke, \$238,289,565; Building Stone, Brick Cement, etc., \$36,605,942; Miscellaneous Minerals, \$1,358,839; Making its mineral production to the end of 1922 show an

### Aggregate Value of \$734,259,619

The substantial progress of the Mining Industry of this Province is strikingly exhibited in the following figures, which show the value of production for successive five-year periods: For all years to 1895, inclusive \$94,547,241; for five years, 1896-1900, \$57,605,967; for five years, 1901-1905, \$96,509,968; for five years, 1906-1910, \$125,534,474; for five years, 1911-1915, \$142,072,603; for 5 years 1915-1920 \$189,922,725; 1921, \$28,066,641; for the year 1922, \$35,158,843.

### Production During last ten years, \$339,280,940

Lode-mining has only been in progress for about twenty-five years, and not 20 per cent. of the Province has been even prospected; 300,000 square miles of unexplored mineral bearing land are open for prospecting.

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- Building and Ornamental Stones of Canada (British Columbia.) Vol. V., by W. A. Parks, Ph. D.
- Barium and Strontium in Canada, by H. S. Spence.  
The Coalfields and Coal Industry of Eastern Canada, by F. W. Gray.
- The Value of Peat Fuel for the Generation of Steam, by J. Blizard, B. Sc.
- Analyses of Canadian Fuels. Parts I to V, by E. Stansfield M. Sc., and J. H. H. Nicolls, M. Sc.
- Graphite by H. S. Spence.
- Gas Producer Trials with Alberta Coals, by J. Blizard and E. S. Malloch.
- Summary Report of the Mines Branch, 1920.  
The Mines Branch maintains the following laboratories in which investigations are made with a view to assisting in the development of the general mining industry of Canada:—
- Fuel Testing Laboratory.—Testing value of Canadian fuels for steam raising and production of power gas; analyses, and other chemical and physical examinations of solid, liquid and gaseous fuels are also made.
- Ore-Dressing Laboratory.—Testing of Canadian ores and minerals, to ascertain most economical methods of treatment.
- Chemical Laboratory.—Analysing and assaying of all mineral substances and their manufactured products. Copies of schedules of fees, which are slightly in excess of those charged by private practitioners, may be had on application.
- Ceramic Laboratory.—Equipment is such that complete physical tests on clays and shales of the Dominion can be made, to determine their value from an economic standpoint.
- Structural Materials Laboratory.—Experimental work on sands, cements and limes is also undertaken.
- Applications for reports and particulars relative to having investigations made in the several laboratories should be addressed to The Director, Mines Branch, Department of Mines, Ottawa.
- Summary Report. The annual Summary Report of the Geological Survey is now printed in parts. Applicants should, therefore, state what particular geologist report is required, or what subject they are interested in.
- Memoir 108. The Mackenzie River Basin, by Charles Camsell and Wyatt Malcolm.

### GEOLOGICAL SURVEY

#### Recent Publications

- Memoir 119. The Reed-Wekusko Map-Area, Northern Manitoba, by F. J. Alcock.
- Memoir 121. The Malagash Salt Deposit, Cumberland County, N. S., by A. O. Hayes.
- Memoir 123. Sixtymile and Ladue Rivers Area, Yukon, by W. E. Cockfield.
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- Memoir 130. Geology and mineral deposits of the Bridge River map-area, British Columbia, by W. S. McCann.
- Memoir 131. Kenogami, Round and Larder Lake areas, Timiskaming district, Ontario, by H. C. Cooke.
- Map 1585. Mackenzie River basin, 1922 edition. Geology.
- Map 1751. Wainwright, Alberta. Topography.
- Map 1752. Monitor, Alberta and Saskatchewan. Topography.
- Map 1754. Upper Elk and Highwood rivers, British Columbia and Alberta. Topography.
- Map 1829. Salmon River area, Portland Canal mining division, B. C. Geology.
- Map 1831. Vegreville; townships 47 to 55, ranges 11 to 16 west of the 4th meridian, Alberta. Topography.
- Map 1835. Beauceville, Beauce county, Quebec. Geology.
- Map 1836. Explored routes in a belt traversed by the Canadian National Railways between Longlac and Nipigon, Ontario. Geology.
- Map 1860. Keno Hill area, Mayo district, Yukon. Geology.
- Map 1882. Bridge River, B. C. Geology.
- Map 1901. Upper Kitzault valley, B. C. Geology.
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- Applicants for publications not listed above should mention the precise area concerning which information desired.
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# Ontario's



# Minerals

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DEPARTMENT OF MINES

HON H. MILLS, Minister of Mines

## Mineral Areas.

Ontario, with its 407,262 square miles, contains many millions of acres in which the geological formations are favorable for the occurrence of minerals, 70 per cent of the area being underlain by rocks of pre-Cambrian age. The phenomenally rich silver mines of Cobalt occur in these rocks; so also do the far-famed nickel-copper deposits of Sudbury, the gold of Porcupine and Kirkland Lake, and the iron ore of Magpie and Moose Mountain mines.

## Economic Minerals.

In addition to the above, practically all economic minerals (coal and tin excepted) are found in Ontario:—actinolite, apatite, arsenic, asbestos, cobalt, corundum, feldspar, fluor-spar, graphite, gypsum, iron pyrites, lead, mica, molybdenite, natural gas, palladium, petroleum, platinum, quartz, salt, talc and zinc. This Province has the largest deposits on the continent of talc, feldspar, mica and graphite.

Building materials, such as ornamental marble, limestone, sandstone, granite, trap, sand and gravel, lime, portland cement, brick and tile, meet every demand.

## Mineral Production.

Preliminary returns show the output of the mines and metallurgical works of the Province for the year 1921 to be worth \$48,128,387, of which the metallic production was \$27,574,202.

The following figures show the rapid growth of Ontario's mineral industry by five-year periods since 1891:

| Year.          | Value.      | Year.          | Value.       |
|----------------|-------------|----------------|--------------|
| 1891 . . . . . | \$4,705,672 | 1906 . . . . . | \$22,388,383 |
| 1896 . . . . . | 5,235,003   | 1911 . . . . . | 41,976,797   |
| 1901 . . . . . | 11,831,086  | 1916 . . . . . | 65,303,822   |

## Dividends.

Dividends and bonuses paid to the end of 1921 amounted to \$23,140,734 for gold mining companies, and \$84,388,185 for silver mining companies or a total of \$107,528,919.

## Mining Regulations.

A miner's license costs \$5.00 per annum, and entitles the holder to stake out in any or every mining division three claims of 40 acres each. After performing 200 days' assessment work on a claim, patent may be obtained from the Crown on payment of \$2.50 or \$3.00 per acre, depending on location in unsurveyed or surveyed territory.

## Assay Office.

The Provincial Assay Office at No. 5 Queen's Park, Toronto, is maintained by the Department of Mines for the free identification of minerals, free assays under the provisions of the Mining Act of Ontario, and also for general assay work as per the Schedule of Charges which may be obtained on application.

## Temiskaming Testing Laboratories

The Department maintains, at Cobalt, an ore sampling and testing laboratory which is now prepared to receive parcels of gold ore from 100 pounds upward, and after sampling and assaying the same to pay to the shipper the value thereof, less treatment charges. The purpose is to afford a market for ores extracted by prospectors and others in developing their mining claims, enabling them to obtain funds which they can use for further work and to report on the most satisfactory method of treatment. Fuller information may be obtained on application to the Manager, Temiskaming Testing Laboratories, Cobalt, Ontario.

## Publications.

For list of publications, illustrated reports, geological maps and mining laws, apply to

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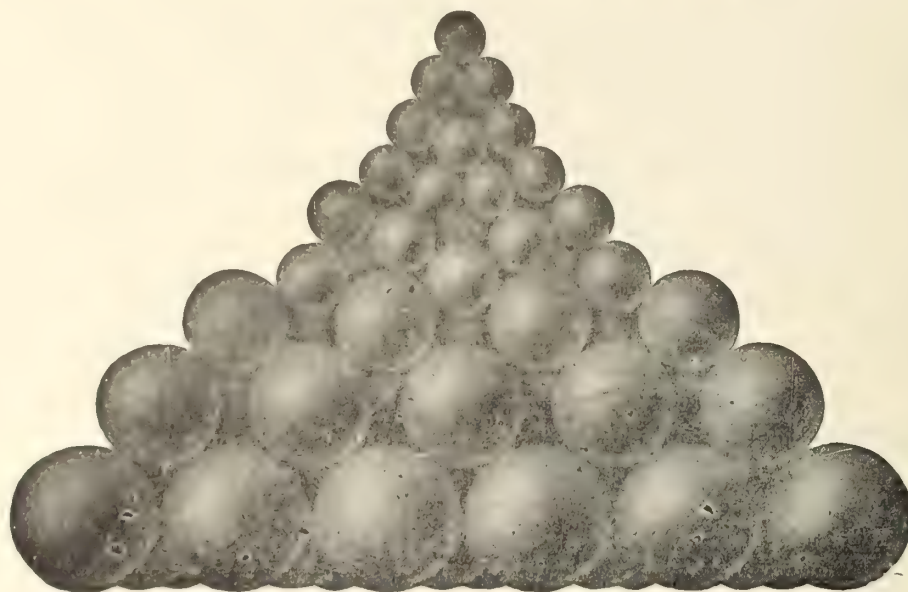
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to their progress in Canada*

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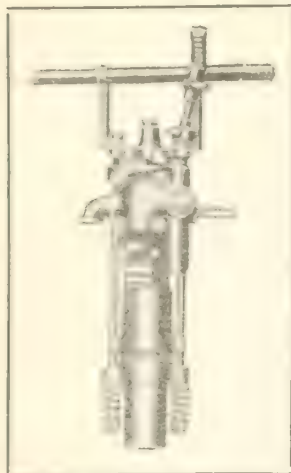
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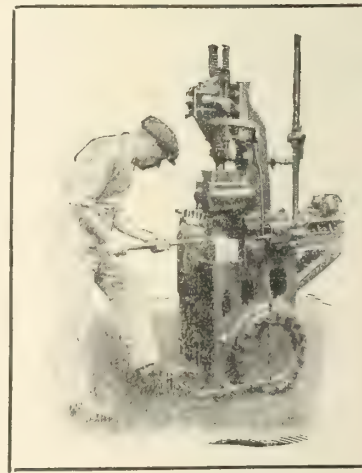


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## -:- EDITORIAL -:-

### PUBLICITY OFFICER FOR MINING REQUIRED

The mining industry in Canada needs well-directed publicity. Mining affairs are much to the fore these days in most of our newspapers and periodicals; but a large part of what is written, and read, is trash and most of the rest is propaganda in favour of stock-selling schemes and the like. From the point of view of the professional mining man, the larger part of the mining "news" now circulated is a joke.

The mining industry is no joking matter, and this continuous circulation of "news" that is a libel on the industry should be taken seriously by those interested in its progress. A serious responsibility rests upon each and every member of the mining and metallurgical fraternities, most of whom are at present content to sit back and smile at the gullibility of the average reader of newspapers and magazines. The same responsibility rests upon the various government departments concerned with the mining industry. It is the position of these latter that we shall examine briefly today.

Each of the provinces has a Department or Bureau devoted to its local mineral industry, and each of these is a centre, actual and potential, of information concerning the industry. The largest of these Departments, that of Ontario, is comparatively small, and its operations do not justify the organization of a special branch or service for sending out information and news. However, as all these Departments or Bureaus are small, they are conducted in a comparatively informal way, and on that account a good deal of information that would otherwise remain buried in their files commences on a career of useful existence in the public press. Nevertheless there is plenty of room left for extending this useful contact between provincial mining departments and the general public.

It is in the central departments in Ottawa, however, that the bulk of the information about Canada's mineral resources and their development is collected, and it is to Ottawa that we must turn for the bulk of our data and technical records. These are readily available in the form of annual and other periodical reports, memoirs, bulletins, and so forth, and in each department or branch the means is provided for giving all information available to those that inquire.

This provision does not, however, touch the problem to which we have reference in the present instance. A mere handful of our citizens will write for informa-

tion to Ottawa, whereas the larger part of them notice the paragraphs in the public press dealing, or purporting to deal, with mining.

Is it not feasible to effect a working alliance between the departments at Ottawa and the public press? Of course it is feasible. It has been done in the case of a number of departments, but not yet with the Department of Mines. The present Government realizes fully, as did its predecessor, the value of publicity in this connection, and three of the Departments,—Trade and Commerce, Immigration and Colonization, and Interior — have special branches for the purpose of spreading abroad authentic information. Until recently the Fisheries Department also had such a branch, and will have it again.

The Department of Mines should have a special publicity branch and we believe it could be had for the asking. A precedent has been set; the need is obvious; the expense would be trifling; the value returned would be a hundred-fold. Already the Department of the Interior, in its publication, "Natural Resources," issued monthly to the public press, includes articles dealing with our mineral resources. This should be amplified and systematised under a special officer of the Department of Mines.

A glance through this issue of the "Canadian Mining Journal" will show a number of paragraphs and short articles referring to the activities of the Bureau of Mines and the Geological Survey in Washington. These are selected from a dozen or more such press reports that come, each week, to our desk, generously made available by our neighbors to Canadian periodicals as well as to those in the United States. These press reports are valuable, both to the public and to the departments concerned. Their circulation prevents in large degree the garbled accounts that would otherwise be printed. There is a corps of over six hundred public employees in Washington specially charged with this work. In Ottawa we have three.

It is up to our Canadian miners and metallurgists, our Institute of Mining and Metallurgy, and others interested in the mining industry, to stimulate a request to the Government from the Department of Mines in Ottawa for a trained publicity officer, engaged at a salary adequate to ensure his proficiency. It is up to them also to back the Department of Mines in this request by every means at their command. The country, as well as the mining industry, needs this service.



### FIRE PREVENTION IN ROUYN DISTRICT

Fire will be a very serious menace in the gold district of northwestern Quebec during the coming season. None realize this better than the officers of the Department of Lands, Forests and Mines in Quebec, who are responsible to the people for the preservation and proper use of the forests, and the owners of the timber and pulpwood limits in the area affected. Both public and private property are threatened and must be protected.

Our correspondent for Quebec outlines today the measures that have been taken by the provincial government authorities for the prevention of forest fires in the Rouyn district next summer. These provisions seem to be eminently suitable to the case, as well as practicable. Their efficacy will depend mainly upon the manner in which they will be applied. Judging by the practical solicitude of the Quebec authorities for their forests as demonstrated in other instances, the enforcement of these preventive measures against fire will be strict and impartial. The Chief Forester for Quebec will have a big job on his hands next summer. One little forest fire will cost more than the upkeep of a whole staff of fire rangers.

The private companies owning timber and pulpwood limits in this area can, and no doubt will do much to aid the force of provincial fire rangers in protecting the forests from fire. These companies now use aeroplanes commonly, and a constant patrol over the areas congested with prospectors and miners will be a constant reminder of the personal responsibility that rests upon each man in the woods.

The key to the whole system of fire prevention is the fixing of personal responsibility. To this end the regulations of the Quebec government have been devised, and to this same end the efforts of their agents in the field will be directed. If every man entering the gold area, for whatever reason, is made fully to realize his responsibility, there will be few, if any forest fires. We hope that by this and other means the magnificent stand of pulpwood and the fine timber in this area may escape the havoc wrought by fire in most of the other mining districts in eastern Canada.

### CUTTING DOWN EXPENSES

In the natural course of things it cannot be long now before the Budget is "opened", as the phrase runs, in Parliament. While speculation as to its probable contents must necessarily be in the nature of guess-work, at the same time it would seem highly probable that these will not include any downward revision of general tariff duties. If we are right as to this, protests may be expected from some of the Progressives and from an occasional Liberal of pro-

nounced Free Trade proclivities, like Mr. A. R. McMaster, M.P. for Brome. But such protests, even if not merely formal, are likely, we imagine, to weigh little with the Government. For just now, when business conditions seem to be in process of definitely picking up, is no time for the introduction of radical tariff legislation with its inevitable accompaniment of business and commercial unsettlement.

It seems likely that those who advocate tariff reduction will have to content themselves with the commercial treaties with France and Italy as tending in the direction desired by those of their school of fiscal thought. In addition, they are likely to be somewhat appeased by the extension to Great Britain of the special rates accorded to France and Italy. But we confess we should be surprised if the Government were to lower the rates on British imports, except as just suggested, in order to make up for such diminution in the British preference as may be resultant from the negotiation of the treaties with France and Italy.

But, whatever the nature of the forthcoming Budget in such respects, it is sincerely to be hoped that it will not be a Budget providing for further increase in taxation. For if the trade of Canada is to make a recovery that can fairly be termed rapid, it is essential that there should be not an increase, but a reduction, in taxation. The present Finance Minister, during the past year, has more than once taken occasion to emphasize the necessity for the country to practise economy, and has himself made an earnest effort to reduce expenditures. But in spite of this the country has not succeeded in reducing its national debt. There are only two ways in which this can be done — either by increased taxation or by further reduction in expenditure. As we have just said, the adoption of the former alternative is bound to hinder the expansion of business. Accordingly, the Dominion Government must continue the lead it has given the country in the matter of undertaking retrenchments.

Before today we have called attention to the far too facile tendency of large sections of the public to regard colossal expenditures as unavoidable. This is true not only of large sections of the public, but also, unfortunately, of some Governmental authorities as well. And the time has come to call a halt to all this.

As a people, we unquestionably need to practise economy, both in public affairs and also individually, more than we are prone to do. Indeed, the equanimity with which large sections of the public are disposed to regard colossal expenditures probably has its rise in the individual extravagance which is all too prevalent in this country nowadays. There is great need among us in this country today for the placing of the right emphasis on the right things of life — for the putting of first things first. Addiction to extrava-



gance saps the foundations of good citizenship. For just as it is true that no person can practise thrift without being a better citizen, so is it equally the case that the will and the moral fibre are weakened by the placing of a false estimate on the pleasures that "easy spending" can bring. Thrift has a moral, as well as a material, value alike for the individual and for the nation. It is a character tonic for both. And, both individually and collectively, we need to lay that truth to heart if we are to cope successfully with the many and complex problems presented by the days in which we are living.

### POWER FOR THE GOLD MINES

The power situation in the north has changed with startling rapidity during the last few weeks. Five weeks ago, we pointed to the possibility of using Quebec power for Ontario gold mines; today that event seems fairly certain of consummation. While the Porcupine mines have been reduced to one-sixth of their normal power supply due to the recurrent period of low water, and while the provincial authorities of Ontario have continued to dilly-dally over the negotiations for power on the Abitibi River, the provincial authorities of Quebec have offered for sale the upper powers on the Quinze River.

Power from the Quinze River is, after all, the logical solution of the power problem for any and all the present and prospective mineral areas within a radius of a hundred miles or more. One of the reasons why a power company, or even a mining company itself, hesitates to develop a water-power for the use of mines is the comparatively short life of any but the extraordinary mine. A modern hydro-electric installation will exist usefully for scores of years. The average mine is worked out within ten or twelve years. Even the average mining camp has a life much less than that of a power development.

If the risk a power company takes when it depends for its custom upon mines is spread over a whole camp, it is much reduced. If its power serves a number of camps, the risk is still further lessened, especially if the camps be in different stages of development, one requiring an increasing amount of power during its youth while another's requirement it declining. When, in addition to a number of established and prospective mining camps, the potential market includes pulp and paper mills, saw mills, and a wide area where settlement is progressing rapidly, the attraction for the development of water-power is so much the greater. Such is the fortunate situation of the Quinze power.

Owing to this fortunate conjunction of circumstances, present and prospective, we can be sure that the gold mines about to be established in the eastern part of the gold belt will never suffer for lack of power as have those at Porcupine. The advantage to the new owners of the Quinze power and the owners

of the new mines will be mutual — each will help to develop and maintain the other. The 100-mile transmission line to Porcupine is well warranted by the proved value and comparative permanency of the mines there. It is probable that the Kirkland area, too, will require more power than is available from its present sources of supply before it is fully developed, and it is not far off the direct way from the Quinze River to Porcupine.

Meantime the mines of the Porcupine camp are confronted with the certainty of a shortage of power once more during the period of low water next winter. Small power developments now in progress will alleviate the situation somewhat, but they cannot make up the deficiency. It is improbable that the period of low water will be so long or that the flow will be so extremely attenuated as it has been this year; but still the loss of production due to shortage of power will cost the country millions of dollars. We can look to the Quinze power to right the case by the time the winter of 1924-1925 binds the waters of the north.

### ALBERTA COAL FOR TORONTO

The measures now in hand by the provincial government authorities in Toronto to test the feasibility of using Alberta coal there, are entirely admirable. They reflect in a very practical way the interest taken by the officers of the Ontario Department of Mines in the symposium on fuel supply at the Institute meetings in Montreal last month. No other authority is, we would judge, in so favourable a position to negotiate with the Canadian National Railways for suitable freight rates and for the provision of suitable rolling-stock for this long-distance haul.

It is hardly likely that any private company would be willing either to run the risk of financial loss on a shipment of coal from Alberta to Toronto, or to break their established connections with American producers. The government is fully justified in making the experiment, and the public can well afford to absorb any loss incurred in such a cause. The Canadian National Railways, too, have something to learn about the cost of hauling coal for such a distance, and their part of the experiment will be somewhat in the nature of research.

It is highly satisfactory to know that western fuel engineers, well accustomed to the use of Alberta coal, are already on hand to advise the prospective users in Toronto. This is a precaution whose neglect has wrecked many a similar attempt at progress in the past. From the evidence at present available, it appears that this first experimental shipment of coal from Alberta to the east will be made under the best possible auspices.

We are pleased to have Mr. Cole's definite assurance, in the letter on another page, that the Temiskaming Testing Laboratories at Cobalt have considered



carefully, and provided fairly for, the rights of private assayers in fixing the schedules of prices for assays. Mr. Cole does not mention contracts for assays in large numbers or other special cases, so we assume that these are covered in the general regulation. Any dissatisfaction with a public institution such as the Temiskaming Testing Laboratories can best be dispelled, if ill founded, by a public statement such as Mr. Cole's, and if well founded, it will be soonest mended by being brought to the light of day in public discussion.

Dr. H. C. Cooke's interim report on his geological survey of part of the new gold area in Quebec last summer will be published during the coming summer. Meantime he has prepared a short report giving the conclusions derived from his geological studies and some practical hints to prospectors, which appears in this issue of the "Journal". We are confident that the information thus made available by the Director of the Geological Survey at a time when many parties are preparing to work in the new gold field will be much appreciated by them. We shall look forward with interest to receiving the further information that will be made available when Dr. Cooke shall have completed further researches in the field during the coming season.

### THE PRESIDENT

Truly, a printer's error is sometimes worth while. If the "Canadian Mining Journal" had been unimpeachable in its proof-reading our poet would never have been inspired to the following verse, our artist would have lacked his present inspiration, and the President of our Institute would not have been immortalized thus by pencil and by brush:

#### The Wonder Child

John Dresser, who seems old enough to be  
 Father Confessor to yourself and me,  
 Was born (see Journal, March sixteenth and page  
 One ninety-nine in 'eighty-six. His age  
 When graduating from McGill was nine!  
 Great Guns! That's something wonderfully fine!  
 Precocious child! so lavishly endowed  
 With mental growth to others not allowed!  
 Say, Kid, I have no wish to treat you rough,  
 But how the dickens did you run the bluff?  
 I'm now aware, despite your light-blue eyes,  
 You are not preternaturally wise  
 As outwardly you seem. But, kiddo, say,  
 You're more than thirty-seven, ain't yuh, hey?

J. C. M.

To the Editor, "Canadian Mining Journal."

Sir: — In your article in the issue of March 16th on Mr. Dresser, our worthy president of the Institute, I do not think that you did the subject sufficient justice. In some ways your remarks are what is vulgarly called "slams". For instance you state that his record of

such work (geological) is voluminous. If it is voluminous and nothing else, surely nothing more cutting could be said about it.

Another point in which you failed to do him sufficient justice was in his remarkable achievement. It is stated that he was born in 1886, and graduated from McGill in 1893. I was so struck by this achievement that I got in touch with the McGill authorities and through Dr. Adams, who kindly introduced me to an official called the Archivist, I was able to get some interesting information. It appears that it has been a practise at McGill to make a portrait of any of their graduates who have shown extraordinary ability and keep them filed to see how they turn out in after life. The artist that I was able to persuade to undertake this, Mr...., was allowed to take a copy of this



portrait which I am enclosing for you to publish along with this letter. It is noticeable at once how well developed he seems to be mentally. His head dwarfs the body, and the blue eyes which are referred to in your article as the most striking feature, are well depicted by the artist. In fact they remind one of the old ballad: "With eyes so blue, and heart so true, that none with him compare."

I hope you will make good your delinquency by publishing this portrait and letter.

"Ardent Admirer of the President."

Official advice received privately in Montreal from the headquarters in New York of Continental Mines says that the contact has been cut in the Colonial shaft at Cobalt at 962 feet, and that it is "well mineralized." It was expected originally that the contact would be reached at 800 feet.

# THE MONTH

A CASUAL REVIEW

**The Uses of Adversity**—No mere warnings through the press would have sufficed to stir up the interest that Canadian governing bodies are now manifesting in the solution of our urgent fuel problem. Repeated shortages of coal, culminating in an incipient famine, have at long last opened the reluctant eyes of our legislators.

With this wakening has come a flood of talk, febrile talk and fallacious argument. Loquacious members of the Dominion Parliament have delivered themselves of multitudinous mouthings. Courses of action, incidentally sound, but **only** incidentally, have been urged as panaceas. As the question is complicated to a very high degree, and as it involves the closest study of the economics of mining, transportation, utilization, and labour, it is certainly not to be expected that the casual politician will be able either to diagnose the trouble or to prescribe the cure.

A general view of the situation indicates that relief will come in different ways in the East, Central, and West parts of Canada. The proposal to establish large by-product coking plants in large centres has much to recommend it. It is possible, however that low-temperature carbonizing plants may be better adapted for the double purpose of providing a domestic equivalent of anthracite and, at the same time, immediately saleable by-products. Quebec requires about 5,500,000 tons of coal annually; the Maritime Provinces and Newfoundland require not less than 2,500,000 tons. Since the output of New Brunswick is negligible, it is apparent that Nova Scotia's output will have to be very largely augmented if, in addition to taking care of the large demands of the railway and bunker trades and of its iron and steel plants, the total requirements of Eastern Canada are to be supplied.

The question of the extent to which Ontario can depend upon coal from Alberta has yet to be answered. The final answer must come from the executive heads of our national railways. As in Nova Scotia, so in the West, coking and low-temperature carbonizing will play a determinative part. It is to be regretted that we have heard nothing conclusively hopeful about the \$1,000,000 briquetting plant erected by the Dominion, Manitoba, and Saskatchewan Governments near Estevan, to treat the Saskatchewan lignites. The plant was erected at the urgent instance of the Research Council. The progress of the most recent experiments there has not yet been announced.

The most favorable survey shows no possibility of neglecting any longer, without suffering the direst consequences, the development of our huge and rich peat bogs. It will take ten years to make Canada self-supporting in fuel. Our coal mines cannot meet the nation's needs until they shall have been enlarged and re-organized. Our normal requirements amount to about 30,000,000 tons per annum, our output to half that total. In a few years our needs will have doubled. Every resource that is ours will have to be implemented with diligence and speed.

**Great Britain's Balance.**—The astounding resiliency of Great Britain's finances is comforting. The Govern-

ment's unexpected balance of £100,000,000 gives assurance of some easing of the terrific burden of taxes that citizens of Great Britain have been carrying. This, in turn, encourages us to hope that more overseas capital will be diverted to Canadian mining. Even now a fair stream of British money is coming over. The overseas investor's chances of fair treatment are incomparably better now than they have been in days past. They can be made still better if our newspapers will consent to take a stand against the slim promoter.

**Porcupine's Power.**—Comment on the quarrel between the Hollinger and the Northern Canada Power Company is not decorous, since the case is **sub judice**. Whatever the merits of the contestants' claims, the result is the same—the whole camp is paying the shot for somebody's stupidity—or cupidity. If investigation proves that the present grievous shortage could have been avoided, then somebody's crime should be fittingly punished.

**The Circle Widens.**—Last year, for the first time since official records have been kept, Quebec's metaliferous mines made no shipments. This, of course, was attributable to conditions that were temporary and that will pass. It is probable that gold production, on a respectable scale, will be begun as soon as the preliminary work of selection and development shall have been performed on a number of the genuinely promising properties east of the Ontario-Quebec boundary, and unmistakably in the same geologic province as are Porcupine and Kirkland Lake. Authentic information as to these deposits will not seep through for some weeks or months yet. It is eagerly awaited.

Meanwhile, English capital is being samely expended in a well-conceived effort to appraise the value of certain gold-bearing veins in the western part of Ontario that was once the cynosure of many eyes. Properties near Mine Centre will be given the benefit of modern attention. It is within bounds to say that if these properties were new discoveries they would attract more investors than—well—than they do. They are eminently deserving of painstaking investigation.

The Portland Canal region, which is essentially not a poor man's country, is coming into its own spectacularly. An intimate history of individual enterprises in this district would exhibit an astonishing reversal of professional opinion. The striking success of the Premier mine has had a repercussive effect. No doubt we are witnessing but the beginning of things in Northern British Columbia.

Taking it by and large, prospects for Canadian mining never seemed quite so cheering as they now appear. If we can mitigate the threatened frenzy of a "boom" then the position of the mining industry will have been greatly strengthened before the summer is over.

J. C. M.

The Italian production of sulphur fell from 313,400 tons in 1921 to 191,600 tons in 1922, thus reflecting the competition of cheap sulphur from Texas and Louisiana.



# THE QUEBEC GOLD FIELD

## GEOLOGICAL DEDUCTIONS, AND HINTS FOR PROSPECTORS

By H. C. COOKE

In accordance with its policy of keeping ahead or at least abreast of the prospector as far as possible, the Geological Survey sent a large party into Quebec in the spring of 1922, to commence the detailed mapping of the area east of Larder Lake. The work was undertaken because results obtained in Ontario in 1919 and 1920 had made it evident that the rock formations of the Kirkland and Larder districts extend eastward across the interprovincial boundary, and it was therefore anticipated that sooner or later prospecting would be carried into Quebec and ore deposits of economic importance discovered. The discoveries made in the latter part of the summer, and the consequent rush of prospectors to the area, have fulfilled these anticipations sooner than was expected.

### Area Mapped

The areas examined last summer, which are known as the Opasatica and Duparquet map areas, have been mapped in as great detail as time permitted. The new maps will be published on a scale of 1 mile to the inch, and will show not only the distribution of the various rock formations, but also the approximate size and shape of the various areas of outcrop, as nearly as these could be determined under the circumstances. Such a separation of rock areas from drift-covered areas is of value to the prospector, as showing where his operations can be most easily carried on. Particular attention was also paid to the mapping of the smaller bodies of acid intrusive rocks, since these appear to have had a genetic connection with the gold deposits.

Unfortunately the unusually early freeze-up last fall compelled the geological parties to leave the field without entirely completing the mapping of the areas assigned. The demand for information has been so great, however, that a report of the results obtained is being published in the Summary Report of the Geological Survey, accompanied by a preliminary map. It is hoped that these will be available about the end of May.

### The Temiskaming Series

The geological examination was productive of many interesting and valuable results, both economic and scientific. The latter predominate, it must be admitted, since the principal discovery that caused the rush into Rouyn township was made late in the fall when the geological party was leaving the field, and consequently the discovery was not examined by us; and since practically no reliable information concerning the tenor in gold of the ores in other deposits could be obtained that would enable them to be studied effectively. Many facts were gathered, however, encouraging to those who may be considering prospecting the district during the summer of 1923.

A belt of folded sedimentary rocks extends from near the Ontario-Quebec boundary eastward for nearly 100 miles, crossing the southern side of the area examined last summer. The sediments were termed

by M. E. Wilson, who examined the area over ten years ago, the Pontiac Series. When a somewhat similar series was later discovered in the Kirkland Lake district and there named the Temiskaming series, it became important to know what relationship existed between the sediments of the two areas, since if they were identical there might be a possibility that the gold would be duplicated in the Quebec area. Several years of work were required to answer this question definitely, and some years have been occupied in tracing eastward the Temiskaming of Teek township to the provincial boundary. It may now be definitely stated that the Pontiac series of Quebec is identical in age and relationship with the Temiskaming of the Kirkland and Larder Lake districts, although in Quebec the series has been much more strongly folded and metamorphosed than in Ontario. It is also more widespread and thicker in Quebec than in Ontario.

### The Syenite Porphyry

A rock of greater interest to the prospector is the syenite porphyry. In Teek township it forms good-sized sills in the Temiskaming sediments, and on account of its propinquity to the gold deposits is generally considered to have been the source of the ore-depositing solutions. In the Matachewan district it has been definitely proved to be the source of the gold ores. It is encouraging to note, therefore, that this rock has been found in considerable amount in the Opasatica district, and that, as in Ontario, it is closely associated with the principal gold deposits found up to date. Porphyry dikes are found on the property of the Lake Fortune Mining Company, and mineralization is most intense close to the dikes, dying away with increasing distance from them. I am also informed that there is a porphyry dike or dikes adjacent to the Powell vein, southeast of Rosebury lake.

The distribution of the porphyry appears to be rather peculiar. If a line be drawn on the map parallel to the Keewatin-Temiskaming contact, and about 5 miles north of it or thereabouts, the strip between this line and the contact will contain most of the porphyry dikes observed by us. It is possible that this distribution is due only to chance, and that further east the dikes will be found to have no particular concentration; or our observations may have been insufficient, as the greater part of the area is covered with a mantle of clay, which may hide many bodies of porphyry. With due regard therefore to these possibilities, it may be said that present indications suggest that the best area for prospecting is the band about 5 miles wide north of the Keewatin-Temiskaming contact.

### Two Intrusions of Porphyry

It was rather disappointing to find very few bodies of porphyry in the Temiskaming series within the area examined last summer. Only two were discovered, a large one between Olier and Renaud Lakes, and a smaller one on the east shore of Kekeko Lake near the north end. From a prospectors' standpoint it is important to note that both these sills occur in the Temiskaming conglomerate less than a mile from the Kee-

\* Published by permission of the Director, Geological Survey of Canada.



watin contact. The fact suggests the conclusion that the porphyry, during intrusion, found it easier to spread out along planes of bedding or schistosity in the Temiskaming, rather than to break across the bedding for any great distance, and consequently that it is not likely to be found in the upper beds, the schistose graywackes. The examination of the map of the Larder area tends to confirm this hypothesis, although the series is so much thinner there that porphyry might be expected almost anywhere. There is, however, an undoubted concentration of the porphyry toward the base of the series; the largest mass occurs on the contact between the Keewatin and Temiskaming series, and the others not far from the contact. In Teck township the series is still thinner than in Larder Lake, and the relationships are thus obscured. The conclusion may therefore be drawn with considerable assurance, that the area of profitable prospecting within the Temiskaming series will be found to be confined to the narrow belt of conglomerate along the northern contact, a belt rarely more than a mile in width.

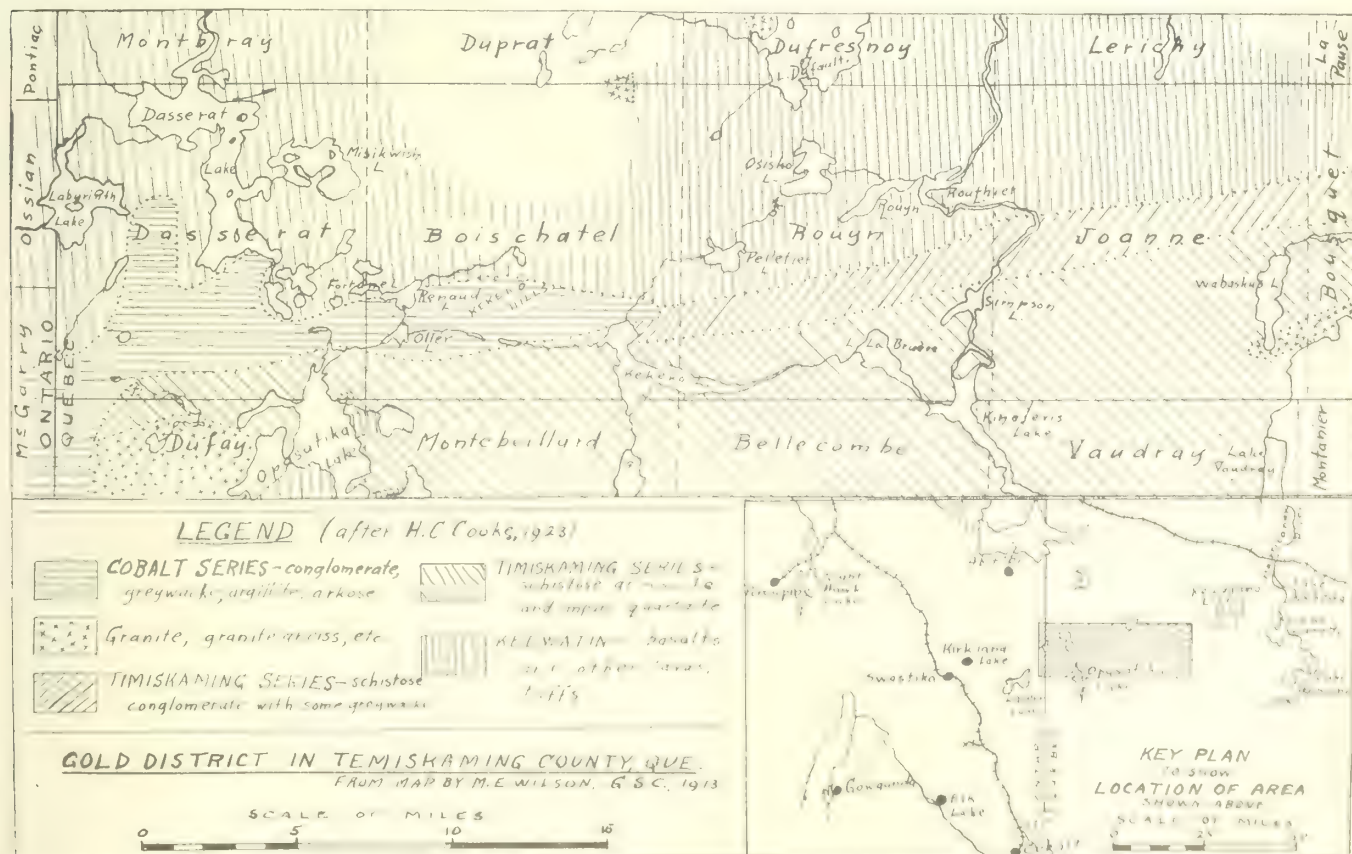
A third rock of possible economic significance is a dike rock termed syenite at Larder Lake. It is massive and reddish, composed largely of reddish feldspar and needles of hornblende. In places the rock has so little hornblende that it might be termed a felsite. Its texture in the hand specimen is for the most part fine-grained and even, though porphyritic in places; the microscope shows however that the porphyritic texture is characteristic, though the phenocrysts are usually so small as to escape recognition in the hand specimen. In places a good deal of pyrite is present, and in such cases also carries gold values, assaying \$2 or even

more per ton. It seems quite possible, therefore, that this rock also acted as a gold bringer, although proof of this has not yet been found. It is also possible that some place may be found where the rock itself is so heavily mineralized as to be itself an ore. The rock is thus well worth the attention of prospectors.

### Gold Occurs in Shear Zones

Burrows and Hopkins have called attention to the occurrence of gold deposits in belts of fracturing and shear at Kirkland Lake. Similar conditions prevail in Quebec. The Lake Fortune deposit occurs in a belt of highly schistose basalt that runs slightly north of east, and has clearly been formed by faulting. The reported discovery of Wright and Billings on Pelletier lake is in a shear zone of similar size and strike. The Horne discovery near Osisko lake is a replacement of highly shattered rhyolite, although the rhyolite appears to have been shattered by drag folding rather than by faulting.

It is thus evident that conditions at Kirkland Lake are duplicated by those in Quebec. In both places the ancient Keewatin basalts and other lavas and tuffs are overlain by a series of folded sediments, the Temiskaming series, and both are intruded by syenite porphyry. In both places the ore bodies are found in belts of shattering or shear in the neighborhood of masses of porphyry. It is evident, therefore, that the search for new ore bodies will best be carried on by looking first for belts of schist or shattered rock, and secondly for masses of porphyry. Belts of schist should be carefully followed up, and if they can be found to pass close to or into the bodies of porphyry,



(The above map, after M. E. Wilson's map sheet of 1913, has been shown by H. C. Cooke's surveys of 1922 to be essentially correct. The geological series have now been correlated with those to the westward in Ontario, and consequently Dr. Cooke's nomenclature is used above. With this exception the above map is the same as that used to illustrate our first description of the new gold field, in November last. — Ed.)



such a place should be carefully prospected, as it is particularly favorable for the occurrence of ore. It may be added that the most favorable type of schist band is one that has an average width of 6 to 30 feet in thickness. Schist bands are apt to be discontinuous and hard to trace, and even if ore were found in them it would have to be very rich to pay for working, and as for the large schist bands sometimes found, 100 to 400 feet in width, these seem to have afforded no large or abundant free ore-bearing solutions that have been passed through them, so that even where deposition took place, the great volume of rock is mixed with the vein materials and values are consequently low.

#### Heavy Cover of Clay

The principal difficulty to be encountered in the Quebec area is the heavy mantle of clay covering the greater part of the surface. The area has been a part of a great post-glacial lake, in which considerable thickness of clays and silts were laid down. Wilson reports thicknesses up to 25 feet along the National Trans-continental railway, and the thickness is probably some what greater in the Opasatica district. Consequently the only areas of exposed rock are the knobs and ridges that once formed islands and peninsulas in the ancient lake. Thus the area to be prospected is greatly reduced, and trenching is rendered somewhat more difficult. The clay also supports a dense growth of underbrush, almost tropical in its luxuriance, through which travel is slow and exhausting; over large areas the traveller must wade waist-deep through a sea of small shrubs, unable to see the ground or to avoid the numerous fallen logs, snags, and holes that beset his path. However, although the mantle of clay is baneful to the prospector it presents compensating advantages in other directions. In many places it supports a heavy growth of timber, a most valuable resource; and when cleared, as it undoubtedly will be in the next two or three decades, it will form as good farming land as any to be found in the north.

#### PLAN OF THE ROUYN GOLD AREA

Two mining engineers who are actively engaged in the development of the Rouyn gold area in north-western Quebec have compiled a plan of the area on a scale of a mile to the inch, white-prints of which can be obtained from E. B. Forrest, 18 Melrose Ave., Montreal. The information available from government reports, and maps forms the basis of the plan, to which has been added information from the recording office in Quebec and additional information obtained privately in examinations of the area. The plan shows, in addition to the principal topographic features, the geological contacts and the claims recorded, with names. It should prove very useful to those interested in the new

#### PROGRESS IN RESEARCH ON SPONGE IRON

Work has been conducted for some time past at the Seattle Station of the Bureau of Mines in the hope of developing a method by which sponge iron can be made by using low-grade coals and iron ore in a direct-fired rotary kiln. The sponge iron will be useful in the production of foundry iron and steel as also for the precipitation of copper from solutions resulting from leaching operations.

Tests will now be made in a small furnace treating about half a ton of ore per day. Attempts will be made to increase the rate of reduction of the iron oxides of the charge. Concentration studies will be made on the product with a view to obtaining a high grade sponge iron suitable for melting in an electric furnace or for use in precipitating copper from solution.

Melting this sponge to foundry iron involves its carburisation. Consequently the latter reaction has been studied on a laboratory scale and is to be continued on the commercial scale, using some of the local electric furnaces and foundry cupolas. A study of the mechanism of carburisation and of the causes of graphitisation will be conducted in the laboratory. After these studies have been completed, the conditions determined therein will be applied to the melting of sponge iron. — Bulletin of Cleveland Technical Institute.

#### LETTERS FROM READERS

To the Editor,  
Canadian Mining Journal,  
Sir,

I thank you for the editorial contained in your issue of March 30th, drawing attention to the activities of the Temiskaming, Testing Laboratories, and your favorable comments on the arrangements made by the Ontario Government for the buying of gold ores.

In your last paragraph however, your adverse criticism of the assaying department is based on false information and therefore calls for correction.

The sampling plant was originally built and operated by the firm of Campbell & Deyell, Limited. After operating successfully for a number of years, the sampling department became unremunerative and it was decided to close the plant. Mr. Campbell was making arrangements to carry on the assaying department on his own account, when the Government purchased the plant, one of the conditions being that the assaying department should be included. You will therefore see that no new competitor was introduced, but the Government simply carried on a business already in existence. The government however does not stress this part of the work of the Laboratories but carries it on as a necessary adjunct to its other operations of sampling and ore-testing. Moreover, in order to avoid any, accusation of unfair competition with customs assayers, the government raised the prices of the private company 50 per cent and on this basis the business has been run. In the cases of two Cobalt companies, (silver) the Government made specially low rates carrying on old contracts entered into by the former company, but neither of these contracts is now operating. If our clients are willing to pay our higher prices, it would be natural to infer that they consider the service given worth the higher expenditure.

Copies of our schedules are enclosed herewith.  
Cobalt, Ont.,

Arthur A. Cole  
Manager.

Temiskaming Testing Laboratories.

The Alaska Railway the first railway to be built been completed recently by the opening of the Tanana and operated by the United States government, has bridge.

## Making Economic Treason More Difficult

By ALEXANDER GRAY

Statutory antiseptics for speculative improvidence, unwisdom and inexperience have been prescribed by an Ottawa Senator. Thereupon divers and sundry colleagues indulged in one of those oratorical dress rehearsals that encumber the record and convince materialists that "the problems of the world would be settled in a week if we were not so busy solving them, that we have no time left for work." Rude mirth among the gallery occupants — the cynics — and applause from those that crave a code that will rectify intellectual debility, leave matters precisely as they were.

Ottawa thinks of making it an indictable offence for any person to solicit the sale of stock unless the solicitation is authorized in writing by Dominion or Provincial authorities. But it also exempts those who avail themselves of advertisements or circulars, which would weaken the legislation as proposed. Tweedledee and Tweedledum being confusedly juxtaposed, Ottawa's dilemma is no different from that of other administrative, legislative and judicial fountains of wisdom and justice. How to promote sanity among the populace and thwart those who prey upon the credulity of the imprudent, is a problem of increasing moment.

Many are anxious to do something in order that Ponzi, Piggly Wiggly, Stutz, Get-Away-With-It stunts shall be less frequent.

### Opinions of "Wall Street"

"Stealing money in Wall Street seems to be as easy as taking candy from a kid," said Judge Rosalsky, of New York, in passing judgment on crooked bucket shop principals. "Brokers who swindle their patrons and come before me need expect no leniency."

"As long as I live," declared the President of "Piggly Wiggly", who found his company's stock oversold, "I will not be president of any company again that has its stock traded in on the New York Stock Exchange, where the gambler and the speculator have such free reign to ply their trade."

There we have the juridical and lay view of speculative conditions. It remains to be demonstrated whether the graven images will be shattered. Indignant jurists, irate "Piggly Wiggles", the befuddled public and official custodians of the popular conscience, all blame "Wall Street," reckless promoters and speculators, bucket-shop burglars and their ilk, who make it difficult to discriminate between those who have honorable purposes and those who ply their thievery until caught.

According to Judge Rosalsky and the "Piggly Wiggly" president, it is "Wall Street" and Stock Exchanges that are culpable, from the requirement that in commodity exchanges are excluded, for the time being. The Curb Market, being an adjunct to "Wall Street," is included in the arraignment. The whole financial district is an Augean stable, Alsatia up to date. Instead of mines and mining script being pilloried as plundering beyond endurance, here we see the most decisive factors in fiscal affairs so enmeshed in kna-

very that experts in rascality must chuckle. To have "Wall Street" (which embraces Broad Street, New Street, Broadway, William Street and Exchange Place, not forgetting Nassau Street) within the application of Judge Rosalsky's generalization and made to appear as a haunt or lair, is nectar for the nefarious traffickers. Soap box orators and the Fagin element have the word of the Law and the Lawless that nothing good can come out of Wall Street.

By the same token, the "Thieves Kitchen" in Throgmorton Street was aptly named; the Bourse and Boersen are the abodes of malefactors; each and every Exchange — Stock, Cotton, Coffee, Grain, wherever securities or commodities are traded in — is deserving of maledictions and drastic regulation. As for so-called Mining Exchanges, — so utterly utter are they according to those who know nothing about them or who have it that mining of any sort has more percentages against the player than any game of chance — they are so many plague spots deserving of quarantine.

### Exchanges not Solely Culpable

Gamblers have their ups and downs (mostly the latter) in Wall Street, or wherever the cards are dealt from the top and the bottom. If the "pictures" come to the liking of the players, well and good. The marble and the whirling wheel are where you can see your money go; so much cannot be said of innumerable devices whereby Barnum's psychology is proved. A billion-a-year put into fraudulent schemes and worthless securities, however, cannot be laid on the doorstep of "Wall Street" or its synonymous organization in any country, so long as fools and their money are so easily parted and paternalistic legislation is ineffectual against predilections for speculation. "Blue Sky" prescriptions are unavailing, except as admonitions. What cannot be accomplished in the open will be surreptitiously achieved.

The inconsistency of Ottawa in proposing that no securities be sold without authority from Dominion or Provincial authorities, but that circularizing and advertising go unmolested, evokes ridicule. Predatory "brokers" have shown how they can reach the isolated, regardless of "Blue Sky" inhibitions. If reputable brokers (who constitute the infinitely greater number of their class in every great community) would join with investment bankers in a campaign of education, and if advertising departments were more scrupulous, ignorance no longer would be an excuse for parting with cash and dissipating credit that could be utilized in safer enterprises. Discussing this phase and the general urge for remedial legislation and stricter adherence to the verities the "New York Sun" recently had this to say editorially:

"Neither paternal legislation nor educational campaigns will offer complete panaceas. Paternal legislation presupposes ignorance of the majority of men in money matters; education is more promising, in that it gets at the roots of the trouble. But neither takes into account the man who does not want to be pro-



invest or convinced, the man who is actuated by greed, by the desire to get something for nothing, by the eagerness to get fifteen per cent. on his money. It is this man, multiplied, who contributes the most of the billion dollars. He will squirm through nearly any protection, resist nearly any educational campaign, when greed has him by the throat."

### Self-Regulation, not Legislation Required

Replying to the same issues, the "Montreal Gazette" contended that deliberate fraud now is punishable by law, and no law can be drafted to ensure a company against errors of management, mistakes by officials or failures to appropriate changes in the currents of business: "The real protection of the public against fraudulent or foolish investments must lie in the application of common sense to the consideration of the proposals made to its individual members by whoever appears as a vendor of securities or merchandise, lands or anything else of value. Laws cannot be made to secure any such simple protection. The public cannot be taught to be cautious where caution is most needed, not even by experience."

Advocating the improvement of existing laws, and citing the gruelling experiences with "L. R. Steel", against which the public had been warned repeatedly, The Toronto "Globe" adhered to the idea of excusing errors of estimation while imposing further safeguards. It said: "Take the case of gold or oil stock. There may be deliberate fraud. The gold mine may be salted; the supposed oil well may be an ordinary well of water into which kerosene has been poured. On the other hand, the seller himself may be deceived. What he supposed to be a rich vein of gold may be a pocket or a thin vein which peters out; a genuine oil well may be exhausted or its contents drawn off by some rival pumping in the neighborhood. In regard to a manufacturing or trading concern the business conditions may be misjudged. What the buyer has to remember is that there is an element of risk and speculation in all these things, and that the higher the dividend held out as an attraction the greater the risk. Either the buyer must himself be a shrewd business man or he must have confidence in the character of the seller if he is to be reasonably safe..."

"This does not mean that the law is as effective as it might be or that no improvement can be made. There might be stronger provision against fraud or against the holding out of prospects that cannot possibly be realized. The Regina Leader says that many Saskatchewan people might have lost money in Steel stock if it had not been for the firmness with which the officials of the Saskatchewan Government Board refused to countenance any sale of the stock in that Province. Three such attempts were made in vain."

### Well-Conducted Stock Exchanges a Necessity

Out of this discussion the conclusion is possible that, once more, corrective or prohibitive laws are applicable only insofar as they are enforced or enforceable. "Wall Street" is no more culpable than is Washington for the travesty of the Volstead Act. Barnum was right; yet there are those by legions who resent encroachment upon their liberty of thought and action in matters speculative, and other legions who know it all or blindly follow "tips". How to keep money calls for even better judgment than what to invest or speculate in. It is a delusion that this generation as

a whole is any more discreet or sapient than its predecessors, when it comes to being "touted". There are more "touts", more "dips", more "dippies", if the vernacular of the long-fingered and second-storey fraternities be permissible.

To circumvent the iniquities it may be effectual propaganda to denounce certain Canadian stock brokers as "ravening wolves" but it is subversive of exchanges as genuine and indispensable institutions. Were it not for the scrutiny of stock exchanges there would be lower standardization and chaotic valuations, and the covert or aggressive iconoclast and booster would ply his profession without molestation.

Stock Exchanges in the main are constructive. Patrons thereof are apt to overdo things. Brokers belonging to such exchanges cannot designedly destroy their following, becoming "ravening wolves", as the malevolent allege, simply because crops of customers cannot be raised often enough, if for no other reason. Nor can it be reckoned that "the unbeatable game" works one way, on behalf of manipulators. Lawrence Livingston, acknowledged to be the Wizard of Wall Street at this writing, stated the forceful truth, thus: "I can assure you the mere mechanics of deception is of little value. The difference between stock market manipulation and the over-the-counter sale of stocks and bonds is the character of the clientele rather than in the character of the appeal."

### Masters of Speculation Sometimes Fail

The daily speculator who ignores or does not discern the dangers of over-trading, invariably quarrels with his broker, who has his more conservative clientele and his own credit to protect. Even the wisest do not foresee the inevitable. When Anthony Brady died, his estate was larger than that of Morgan's. The Brady trustees, notwithstanding their familiarity with its affairs, did not get rid of all their Brooklyn Rapid Transit shares. They failed to realize that a receivership was impending. Others "on the inside" lost heavily. From this the deduction is drawn that the shrewdest of capitalists and speculators frequently misread their own situations, with trouble at hand. No one will dispute that H. H. Rogers was a master manipulator and magnate. In 1907 he was complacent in the retention of copper stocks, unmindful of the collapse in earning and values that came on the crest of unprecedented prosperity. Further back, the President of the Union Pacific admitted he was overloaded with his own stock in the debacle of 1893. Over-reaching "bulls" betimes are bagged by the "bears". Heinze was a genius of speculation — and got "the count." Gates was mangled, but managed to amass a fortune. We saw Durant at the Mercy Seat. Morgan over-estimated New Haven. Ryan "cornered" Stutz, and "Wall Street" put him in Chancery. Schwab was saved by Carnegie. Livermore has awakened to find he is not infallible. Supermen are not insuperable. Carnegie was vilified for "playing safe."

### Internal Discipline Required

When all is said and done and vituperation has run its course, speculators are essentially of mamillary tendency. "Blue Sky" atmospheres alone will not correct organic or economic ills. The theaters of finance must function if world movements are to be uninterrupted. While mere money-making is not regarded as the most admirable of human accomplishments, it is inadmissible that business could be conducted without



exchanges, which stabilize values even in spite of manipulations. "Sound manipulation", says Lawrence Livingston, "must be based on sound trading principles." What economists and metaphysicians who are endeavoring to minimize speculative wrong-doing will have to bring about is what is described by a recent writer as the "back-to-the-cerebellum movement", the "mastery of the submerged, conscious mind." Mid-Victorian statutory regulations are not going to alter prevalent predilections for risks in the race for a share of the wealth of nations. The glories and glammers of the age are apt to unsettle the finite mind.

Well-wishers of stock exchanges of late have noted the tendency of well-intentioned and reactionary persons to make the language of Emma Goldman, Jim Larkin and Trotsky tame by comparison. Radicals at Westminster and Washington, bloes of one kind or another, have joined in the crusade; and the worst of it is, there is some justification for the outcry against "outside" brokers in particular and against professional manipulators who do the bidding of the higher-ups.

The truth is, there is need of strict discipline within the exchanges and more sanity among large and small speculators. Abuse and the indiscriminate slanging of brokers gets nowhere when the public is eager to fling discretion to the four winds.

"He either fears his fate too much  
Or his deserts are small.  
That dares not put it to the touch,  
To gain or lose it all."

That is intoxicating to those who cannot carry it. Ontario and its Attorney General will have a strenuous time when script editions are "authorized."

### MAGNESITE AND ELECTRIC POWER

Canada's production of magnesite has dropped to zero. There may be an opportunity for its revival in the fact that a basic refractory of the highest quality is now made by sintering magnesite in the electric furnace. This process is now in operation by the Carborundum Company, with promising results. The availability of cheap electric power as well as raw magnesite might stimulate the use of this process in Canada.

### TO UTILIZE ENORMOUS WASTE

Utilization of immense waste from lumber by carbonizing and pressing into fuel briquettes equal in value almost to anthracite has been accomplished in saw-mills in the Pacific Northwest, the National Lumber Manufacturers' Association claims. The process, besides supplying the charcoal briquettes, gives by-products such as tar oil, fuel gas, acetone and alcohol. It is said it will make comparatively cheap fuel available to metallurgical and other industries as well as to homes. It will also facilitate the clearing of cutover waste left by the lumber cutters. The new carbonizing and briquetting process has been developed in a plant at Centralia, Washington, and it is planned to erect ten commercial briquetting mills from Vancouver, B.C., to Marshfield, Ore. It is pointed out that the result if applied to the entire lumber output of the United States would be nearly ten million tons of the briquettes annually.

### THE CASE FOR REVISION OF THE COAL MINING LAW IN NOVA SCOTIA.

#### No Revision Since 1877

In 1908 Mr. T. E. Forster was brought over from England to advise on under-sea mining. After making a careful examination of the submarine areas of Cape Breton, he submitted a report. In it he points out that the provisions of the Nova Scotia Mines Act were drawn up about the year 1877 by Mr. H. S. Poole, then Inspector of Mines. They appear to have remained unaltered (except for one variation on a matter of detail) since that time. After dealing with the different clauses of the Act, and after stating that the only case in which definite regulations for the working of under-sea coal (similar to some extent to those in force in Nova Scotia) have been established is New South Wales, he goes on to say that special conditions occurring in that coal field differ greatly from those of Nova Scotia and for that reason he considers that these regulations generally cannot be taken as forming a guide to those that would seem to be necessary in the case of the Nova Scotia fields.

Referring to the "panel system" of mining in Nova Scotia, he says, "I do not think that any importance can be attached to this method of working, but I consider that it is better to rely on the pillars left for the support of the roof being properly proportioned, with a fair margin of safety, and a careful restriction of the width of the working places and disposition of the same. I am of the opinion, therefore that no advantage can be obtained by the retention or these provisions and that their elimination from the regulations would not lessen the security of the mines, while it would, on the other hand lead to a saving of coal and give improved facilities for working. I am strongly of the opinion that the conduct of under-sea workings cannot, generally speaking, be advantageously provided for by hard and fast rules, and that a careful consideration of the circumstances of each case guided by experience gained in the gradual development of operations, is the proper system to be pursued in such cases.

After working the under-sea areas for the past fifteen years or more, the Cape Breton coal companies have reached the same conclusion as Mr. Forster. In the meantime great expenditure has been made in opening up large districts, taking some coal out, but leaving the great bulk of it behind. The openings that had to be made to win this coal are sufficient to destroy the mine in a very short time should any inrush of water occur.

They afford no safety, but being there by law for safety, are merely a delusion to the mine officials and the miners depending on them for protection of life and property. One opening (and there must always be more than one where haulage is carried on) would admit enough water, especially from the sea, to fill up any colliery. But for ventilation purposes there must be an intake and return airway, feeding and fed by the many other places in a working district. The old provisions of the Mines Act have created a menace to ventilation and have therefore added a danger more constant than that of sea water and equally threatening to life.

No attempt has been made to revise the provisions of the Mines Regulation Act since 1877. Surely that is making haste slowly. The time is now opportune for a revision, which will place under-sea mining in Nova Scotia on a practical and economic basis. — J. M.



### A NEW HINTERLAND

The little-known part of northern Canada crossed by the new Manitoba-Ontario boundary line is described in the current issue of "Natural Resources", the publicity organ of the Department of the Interior, Ottawa, from which the following is extracted:

Every extension of lines of survey and communication into the unknown or little known areas of Canada brings to light resources the existence of which had previously only been conjectured. This was the case in the course of the work done in 1921-22 in determining and marking the Manitoba-Ontario boundary northward from the Winnipeg river.

While the primary object of the survey was to mark the boundary, the importance of collecting topographical and other information, which could very conveniently be done at the time was not lost sight of and special divisions of levellers, geologists, and topographers were attached to the survey party. The length of the line surveyed is about 180 miles. Through this district, also, over 1,100 miles of shore line of lakes and rivers have been mapped, the location and character of all timber along the line has been noted, the adjacent country has been examined geologically, and the elevation above sea level of all points along it has been determined.

Though the extent of this information is in itself small when the size of the area is considered, it furnishes a base from which timber, geological, water-power, and topographical exploration may be economically extended.

While very slight information is yet available regarding the topography or resources of Patricia or the area north of it, the information at hand indicates that a large part of this district is naturally timbered country. The same geological formations that have proven a valuable asset in both the country to the south and east and in the Pas district to the west are to be found here; and water-powers capable of being harnessed into immense developments are known to occur throughout. The entire district is filled with lakes, rivers, and topographical features that are not even suggested on present maps.

In view of the present lack of information in regard to these areas, is it too much to suppose, when full information is obtained, that their resources will occupy a place in keeping with those of the older part of northern Ontario? A reference to these latter resources reveals their extent and range.

The per capita export of wood products in Canada, including pulp and paper, is among the greatest in the world and ranks next in our Dominion to the export of grain. The pulp and paper industry is now carried on through nearly all that part of northern Ontario served by the three transcontinental railway lines that link the grain-producing prairies of the West to Eastern Canada, and at the present time is reaching out into what are now the more inaccessible parts of this area. Two of the pulp mills in operation are among the largest in America.

Another resource—the mineral—has recently come into prominence and has become an integral factor in the development that has already taken place in parts of northern Ontario. The annual silver production and gold production at Cobalt, Porcupine, and surrounding districts is in each case roughly about seven per cent of the world's output. The greatest nickel deposits known are in northern Ontario. In addition there are important copper and iron deposits.

This area possesses, as well, a fertile extent of agricultural land estimated at 16,000,000 acres. On the Winnipeg river, near the boundary between the provinces of Ontario and Manitoba, two immense water-power developments are now in operation and a third is under construction. The fur trade in the vicinity of the Ontario-Manitoba boundary is one of the most important of any of our fur-producing districts.

Thus considering the resources already known and those fore-shadowed, it is seen what a heritage Canadians have in this unexploited and practically unexplored hinterland.

### VOLATILIZATION OF COPPER AND LEAD

Copper volatilizes readily in the chloride volatilization process states the Bureau of Mines, Washington, in Bulletin 211, recently issued. Copper forms with chloride two salts—cuprous chloride and cupric chloride. Cuprous chloride, is the more stable at elevated temperatures. The chlorides, even at temperatures below redness, are volatile. When heated the cupric salt changes to cuprous, and volatilizes as cuprous salt. In an atmosphere of hydrochloric acid, however, the fumes of cuprous chloride may be partly raised to the cupric form, hence collected fumes are usually mixtures of the two chlorides. Oxychlorides of copper may take some part in these changes but, according to tests on collected copper chloride fumes, not an important one.

The reactions between sodium or calcium chloride and the oxidized ores of copper are rapid at moderate temperatures; as extremes of neither time nor temperature are required, the volatilization process for copper from ores is desirable commercially. The percentage of copper may take some part in these changes but acchloride fume to metal by fusing it with lime and coke affords a simple method of treatment.

The presence of some sulphur in copper ores probably helps rather than hinders the chloridizing reactions. On the other hand, if the proportion of sulphide is large, copper sulphate occurs in the fume; when reduced, such fume gives considerable copper matte along with metallic copper. Little iron is volatilized, and the matte occurring with the metal runs high in copper.

Lead is usually the most easily volatilized of all the metals thus far investigated. Lead has been present in nearly every kind of ore treated by volatilization at the Intermountain station, and in nearly every test its recovery or extraction has been higher than that of any other mineral constituent.

### NEW GAS MASK

A "universal gas mask" has been developed by the United States Bureau of Mines, and is described in Technical Paper 300, obtainable on request. The new mask is said to combine convenience and efficiency to a marked degree, and can be used in any air contaminated with small proportions of noxious gases, but with sufficient oxygen for respiration.

### ZINC PRODUCTION OF THE UNITED STATES IN 1922

During 1922 there was produced 352,786 tons of zinc, at a selling price of 5.6 to 6.0 cents a pound, against 200,500 tons worth 4.9 to 5.6 cents a pound in 1921 and 463,377 tons worth 8.0 to 8.4 cents a pound in 1920. Electrolytic zinc accounted for 55,334 tons.

## CANADA'S RESOURCES OF TITANIUM

Titanium white, a new pigment of which the essential constituent is titanium dioxide, is now being made from the mineral ilmenite. This pigment, which is said to possess certain very desirable properties in a higher degree than any other similar material now on the market, is being produced commercially both in Norway and in the United States. It is sold under various trade names, such as kronos brand titanium white (Norwegian) and titanox (U. S.)

A report on Titanium, by A. H. A. Robinson, recently published by the Mines Branch, Department of Mines, Ottawa, discusses the manufacture, properties, and uses of this new pigment as well as those of other useful titanium compounds, and describes in some detail the occurrence in Canada of large unexploited deposits of titanium ores that may in the future become of considerable industrial importance.

In the Province of Quebec, for instance, within 70 miles of Montreal and also within 90 miles of Quebec city, there are large bodies of ilmenite that are readily accessible, that can be cheaply mined, and that show every evidence of being capable of furnishing an output large enough to meet any probable demands for many years to come. In the past, occasional small shipments have been made from them for export to the United States — to be used in the manufacture of ferrotitanium; but the benefits to be derived from any possible export trade in the raw mineral would be small in comparison with those that would accrue from the establishment of a local titanium industry, such as the manufacture of titanium white, for which the conditions seem eminently favourable since the deposits are within easy distance of abundant supplies of hydro-electric energy and markets for finished products. If it is possible to make a commercial success of titanium industries in Norway and in the United States, there is no obvious reason why such an industry could not also be made a success in eastern Canada.

This report on titanium, which comprises 119 pages of text, may be obtained by application to the Director, Mines Branch, Department of Mines, Ottawa.

## GAS AND PETROLEUM IN WESTERN CANADA

During the year 1922 boring operations for the discovery of oil and gas were conducted in different districts in the province of Alberta, in the North West Territories, the Railway Belt of British Columbia and some boring was done in the provinces of Saskatchewan and Manitoba.

Up to the end of the last calendar year, there had been about 230,000 feet of drilling done in Alberta alone. The results have been the discovery and development of one of the great gas fields of the world, the output of which amounts to 180,000,000 cubic feet per day, and is used for domestic and industrial purposes in many of the towns and cities of southern Alberta, particularly in the cities of Medicine Hat and Calgary.

In addition to the gas wells there are six wells producing oil in Alberta, all situated in the southern Alberta foothills area, and one well in the North West Territories. The output from the wells in southern Alberta is not large, but it has been found to be profitable to operate them.

In the provinces of Manitoba and Saskatchewan

and in the Fraser River valley in the province of British Columbia, where some prospecting was carried on, no producing well has yet been developed.

During the year under review, a number of oil wells in the state of Montana, near the International Boundary Line, were "brought in." As result of the success in obtaining oil in Montana, seven different companies commenced boring operations on the Canadian side of the boundary line, but only one has as yet reached any considerable depth, and in this well there are indications of oil and gas, but a producing well has not been obtained.

During the winter months operations ceased in most instances, but it is expected that with the advent of spring, and the resumption of work, some of the uncompleted wells will become producers, and that a number of new wells will be commenced. — "Natural Resources."

## BOOK REVIEWS

SILVER (1913-1919). — Imperial Mineral Resources Bureau — Imperial House, Kingsway, London, W.C. 2, and The British Commonwealth Publishers, Ltd., Montreal, Toronto, Ottawa and Winnipeg — 218 pages — 4s. 3½d. post free.

Though nominally concerned with the six years denoted in the title, this report contains more recent information as well. After reviewing the position of silver in the world's commerce it gives data concerning the world's production and reviews the sources of the metal throughout the world, with attention principally to the British Empire.

In the introduction it is noted that "the world's output of silver is now so largely a by-product in the treatment of argentiferous copper and lead ores that the supply of the precious metal, and consequently its price, may vary widely with the production of such ores."

Canada is the chief producer of silver in the Empire at present, though the annual amount declined from 32 million ounces in 1913 to 13 million ounces in 1921. Australia is second in importance, with 15 million ounces in 1913 and 8 million in 1921, principally from the lead-silver-zinc ore of Broken Hill. India has risen from 125,000 ounces in 1913 to 4 million ounces in 1921, due principally to the rise of the Bawdwin silver-lead mine in Burma.

In Europe silver is won only from lead ores, the largest producer being Germany, with 6 million ounces in 1913 and 3½ million in 1920. Next comes Spain, with 4 million ounces in 1913 and 2½ million in 1921. Africa has no important producers of silver at present and in Asia, Japan leads with 5 to 7 million ounces a year, mainly from ores of lead and copper. In South America, Peru leads, with about 10 million ounces a year, mainly from copper ores while Bolivia produces about 2½ million ounces annually and Chile had reached the same amount in 1920.

The principal sources of the world's silver are in Mexico and the United States. Until recently Mexico produced normally about 70 million ounces a year. For most of the last ten years revolutions cut down the output, but in 1921 it had risen again to 64 million ounces. Formerly precious metal ores were the chief source of silver, but recently base metal ores have become very important.

The United States production of silver is about



equal to that of Mexico, varying from 75 million ounces in 1915 to 53 million in 1921. It is derived from siliceous silver ores, copper ores, and lead ores roughly in equal proportions, that from zinc ores and lead-zinc ores providing only a minor amount.

A bibliography of sixteen pages arranged by countries, concludes the volume.

**PROCEEDINGS OF THE NATIONAL SAFETY COUNCIL.** — Eleventh Annual Safety Congress, Detroit 1922. — National Safety Council, 168 North Michigan Ave., Chicago—1074 pages.

This compendious volume will prove a veritable fount of information to those especially interested in safety work. The Mining Section comprises over 100 pages, containing general discussion, sixteen papers and the discussion on them. The papers include mine hygiene, transport below and above ground, prevention and fighting of mine fires, and safety training and propaganda.

**MINING MANUAL AND MINING YEAR BOOK.** 1923. — by Walter R. Skinner — 15, Dowgate Hill, Cannon Street London, E. C. 4. — 824 pages — price 21s. 6d. post free.

Owing to the interest now being taken in the mining industry this reference work, which is the only annual book published dealing with mining and kindred companies operating in all parts of the world, appears at an opportune moment. This year's issue contains full particulars of 1,350 mining companies, gold, diamond, silver, copper, tin, iron and coal; also exploration and mining investment companies arranged in alphabetical order. The particulars given of each company include the directors and other officials, date of establishment, seat of operations, description of the property, with the purchase consideration, plant erected or in course of erection, present working results, ore reserves, details of capital, calls, dividends paid, and the financial position as disclosed by the latest accounts, highest and lowest prices of the shares for the last three years, also latest price. Lists are also given of the officials connected with the companies and comprise 3,700 directors and 900 mining and consulting engineers, their addresses and the names of the companies with which they are connected. Other useful features of the book are the supplementary index of 2,260 private and dormant companies and those that have ceased to be of public or market interest; crushing tables and outputs from the principal gold mines, showing tons treated monthly, results obtained, and yield per ton; also a dictionary of mining terms.

Mr. Skinner's annual volume, now in its thirty-seventh year, is indispensable to the mining man whose interest takes him beyond his own mine, as well as to the hosts of investors and others to whom mining is a live issue.

**A. S. T. M. — INDEX, 1913-1920** — American Society for Testing Materials, 1315 Spruce Street, Philadelphia, Pa. — 189 pages — price, cloth \$2.50; half-leather, \$3.50.

The proceedings of this important engineering society are now so bulky, and reference to them is re-

quired so constantly by many engineers, that the present index will find wide-spread use. There is an author index in addition to the subject index, and a list of key words comprising eleven pages to aid in using the index.

### NEW USES OF NICKEL

The current number of "Industrial and Engineering Chemistry" contains an article by A. J. Wadhams, manager of Development and Research for the International Nickel Co., giving some of the results of his work and that of other researchers on nickel. Since losing such a large fraction of their former market due to the reduction of battle-ship building, new and extended industrial uses have been sought. Chief among the new developments is a nickel-bearing type of stainless steel, containing 20 to 40 per cent nickel, 6 to 12 per cent chromium and 0.25 to 2 per cent silicon. The mechanical properties are good, as for example a rolled sample giving:

|                     |                          |
|---------------------|--------------------------|
| Tensile strength    | 100,000 lbs. per sq. in. |
| Yield point         | 60,000 lbs. per sq. in.  |
| Elongation in 2 in. | 20 percent.              |
| Reduction of area   | 50 percent.              |

These steels can be readily machined and fabricated. Seamless nickel tubes are now available, consequent upon the production of malleable nickel, amenable to the process of piercing and drawing by which seamless tubes of copper and steel are made.

Nickel added to cast iron in amount from 2 to 4 per cent increases its usefulness markedly, and a number of foundries are experimenting with its use.

Research has indicated that a new nickel-silicon steel has unusual properties of hardness and toughness, and that it is likely to be of commercial importance.

### ROCK DRILL STEEL

"A Handbook of Rock Drill Steel—its Selection, Heating, Forging and Tempering", is the title of a neat 80-page booklet of pocket size just issued by the Sullivan Machinery Company, as circular No. 72-G. Besides being an instruction book for the use and care of Sullivan drill steel sharpeners and drill steel furnaces and accessories, it includes instructions for the proper selection and treatment of drill steel, practical specifications for drill steel, and comprehensive data for the lay-out and construction of an ideal steel-sharpening shop. Among the devices available as aids in this ideal shop are a signal pyrometer, to notify the smith when his heating furnace is becoming too hot, and a simple magnetic indicator to indicate the proper temperature for plunging the hot steel. This latter is simply a magnet suspended in a brass case, with an indicator on top which is displayed when the magnet descends. As steel loses its magnetic quality at the point of decalescence, which is the proper temperature for plunging, a hot bit held against the indicator will show whether or not it has reached this point.

A debate in the Belgian Chamber of Deputies in Brussels has brought out the fact that the estimated output of the Belgian Congo (Katanga district) for 1923 is 45,000 to 50,000 tons of copper, 250,000 to 300,000 karats of diamonds, and 3,000 kilogrammes of gold.



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By John S. Watts \*

Ours being a more or less up-to-date community, we have, along with the other necessities of civilization, our Hebrew Junkman. Although he is now at rest in Abraham's bosom, the naive shrewdness with which he conducted his affairs still affords those who knew him with many a story to pass away an idle moment. Having been born and grown to manhood in Russia, he was not well versed in social etiquette.

In one of his ventures, he enlisted the assistance of one of our business men to help him swing the deal. At a critical moment it became very desirable to close the matter up quickly, and the junkman called on his associate that evening to discuss how this could be accomplished. The Hebrew suggested phoning the sales agent who had the disposal of the goods in question, but his partner objected that the agent would be cross if he was bothered about such a matter at his home in the evening.

"That is all right," said the Hebrew, "I'll phone him and he will only say, 'Oh well, that damned Jew doesn't know any better!'"

\* \* \*

The same Israelite, on being quizzed as to his opinion with reference to his people still looking for the coming of The Messiah, replied that when he was in Russia and being driven from pillar to post because of his birth, he prayed daily that The Messiah should come quickly, but that since he came over here where people were good to him, he was in no particular hurry about His coming.

\* \* \*

I once sailed as extra engineer on the maiden voyage of a new ship equipped with semi-Diesel engines, and because of unfamiliarity with this type of engine and the engines being new and stiff, was rather nervous about hot bearings during my watch. The crank pits being enclosed made matters worse, as I could not feel the bottom ends nor be sure that they were getting oil. At about six o'clock in the morning, my worst fears were realised by a strong smell of burning oil, and I frantically rushed around trying to locate the hot bearing, but could find no other sign of any, and as the smell soon disappeared I kept the engines going but was greatly relieved when my watch was ended. Everything went along fairly well until the same time next morning when the same smell became evident, accompanied this time by smoke, and by following the smoke I finally discovered the hot bearing to be in fact nothing else but a pan of smoking fat on the galley stove, the galley being ventilated into the engine room under the skylight, so causing the smell to surround the engine.

\* \* \*

A butcher shop on Water Street. — A customer looking with disgust at a dirty and discolored side of beef hung there addresses the butcher with "Say, this beef is not fit for human consumption."

Butcher. — "Oh no, that's for ship's stores."

The military occupation of the Ruhr district has reduced the production of coal and coke to such a degree that French metallurgical works are slowly declining in output, coke from other sources being too expensive.

\* Consulting Engineer, New Glasgow, N.S.

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The coal production of the world for the last three years is estimated by the United States Geological Survey to be as follows:

| Country                         | 1920.            | 1921.            | 1922.         |
|---------------------------------|------------------|------------------|---------------|
| <b>North America</b>            |                  |                  |               |
| Canada: Coal . . . . .          | 11,812,871       | 10,636,471       | 10,093,055    |
| Lignite . . . . .               | 3,275,304        | 2,918,991        | 2,797,418     |
| <b>United States:</b>           |                  |                  |               |
| Anthracite . . . . .            | 81,282,000       | 82,076,000       | 47,000,000    |
| Lignite and bituminous          | 515,883,000      | 377,316,000      | 370,000,000   |
| Other countries . . . . .       | 502,308          | 502,200          | (a)           |
| <b>South America . . . . .</b>  | <b>1,794,637</b> | <b>2,040,598</b> | <b>(a)</b>    |
| <b>Europe</b>                   |                  |                  |               |
| Belgium . . . . .               | 22,388,770       | 21,750,410       | 21,234,170    |
| Czechoslovakia: Coal . . . . .  | 11,143,221       | 11,648,399 b     | 10,000,000    |
| Lignite . . . . .               | 19,943,258       | 21,050,712 b     | 19,000,000    |
| France: Coal . . . . .          | 24,293,000       | 28,243,000 b     | 32,000,000    |
| Lignite . . . . .               | 967,800          | 735,600          |               |
| Germany: Coal . . . . .         | 140,766,397      | 145,610,000 d    | 140,965,000   |
| Lignite . . . . .               | 111,887,694      | 123,011,000      | 137,207,000   |
| Poland . . . . .                | 6,660,145        | 7,842,553 e      | 23,800,000    |
| <b>United Kingdom:</b>          |                  |                  |               |
| Great Britain . . . . .         | 233,106,377      | 165,781,404      | 255,892,000   |
| Ireland . . . . .               | 109,845          | 89,958           | (a)           |
| Other countries . . . . .       | 33,521,009       | 36,183,546       | (a)           |
| <b>Asia</b>                     |                  |                  |               |
| British India . . . . .         | 18,250,508       | 19,511,154       | 19,000,000    |
| China . . . . .                 | 19,484,896       | (a)              | (a)           |
| Japan (including                |                  |                  |               |
| Taiwan and Karafuto)            | 30,838,066       | 26,000,000       | 25,000,000    |
| Other countries . . . . .       | 3,482,838        | 4,309,156        | (a)           |
| <b>Africa</b>                   |                  |                  |               |
| Union of South Africa . . . . . | 10,408,497       | 10,339,044 b     | 10,000,000    |
| Other countries . . . . .       | 748,933          | 755,935          | (a)           |
| <b>Oceania</b>                  |                  |                  |               |
| Australia . . . . .             | 13,176,426       | 13,084,210       | (a)           |
| Other countries . . . . .       | 3,127,902        | 3,210,796        | (a)           |
|                                 | 1,318,900,000    | 1,133,600,000    | 1,200,000,000 |

(a) Estimate included in total. (b) Estimated on 11 month's production. (c) Includes the Saar basin. (d) Includes entire output of Upper Silesia from January-May, inc. For months, June-December, only the output of the portion of Upper Silesia awarded to Germany is included. (e) Includes output of the portion of Upper Silesia awarded to Poland for months, June-December, inclusive.

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The Geological Survey, Washington, has just issued the statistics of the lead mining industry for 1922. The total production was 532,662 tons, as against 448,589 tons in 1921 and 529,657 tons in 1920. The average selling price per pound was 5.5 cents in 1922, 4.5 cents in 1921 and 8.0 cents in 1920. Over half the lead ore, 202,245 tons, came from Missouri, Idaho producing 91,487 tons, Oklahoma 67,436 tons and Utah 63,130 tons. Canada provided 3,604 tons of ore and 2,900 tons of base bullion in a total foreign supply of 63,914 tons.

Attention has been called recently to a seam of coal of the best steam quality at Silantek, twenty miles from the coast in Sarawak, Borneo, British East Indies. Bunker coal for nearby ports, notably Singapore comes from Japan and Australia at present, and is of inferior quality. The twenty miles of railway required to connect Silantek with the coast have deterred development up to the present.

It is reported in the Soviet press that the production of gold from the Lena district of Siberia has been resumed on a fairly large scale, and that other Russian gold areas are to be worked during the present year.



# The Mining Districts

BY THE JOURNAL'S CORRESPONDENTS

## QUEBEC

**PREVENTIVE MEASURES AGAINST FOREST FIRES IN NORTHWESTERN QUEBEC.**—In view of expected intensive prospecting during the coming summer over promising geological formations in the counties of Temiscamingue and Abitibi in Northwestern Quebec, the Forestry Branch of the Department of Lands and Forests is organizing the district between Lake des Quinze and the Transcontinental Railway to protect against forest fires the valuable standing timber of the region.

The Quebec law for the protection of forests against fire has many provisions. Amongst others it is stated that no one shall set fire to standing trees, to wood-cuttings or slashings between April 1st and November 16th, except for the purpose of heating or cooking. It also provides for spark arresters over the smoke-stacks of all establishments located in the forest.

Anyone wishing to undertake development work on claims recorded in Dasserat, Rouyn, Boischatel and surrounding townships will be well advised to familiarize himself with the regulations enacted for the protection of the forests. Information on this subject will be willingly supplied either by Mr. G. C. Piché, Chief Forestry officer, or by Mr. T. C. Denis, Superintendent of the Bureau of Mines, Quebec.

Preliminary steps in the organization for the protection of the forests against fire have already been taken. Coöperation is assured between the Ottawa River Forest Protective Association, Ltd. and the Forest Fire Prevention Bureaus of the Ontario and Quebec Governments. Look-outs with telephone connections will be constructed at points along the inter-provincial boundary and on elevated points elsewhere in the district.

To enforce the prescriptions of the law, the Forestry Branch is planning to have a full staff of forest rangers to patrol the whole region. These officers will see to it that, besides "bona fide" prospectors only bearers of "travel permits" are allowed to roam in the bush. To keep out all others, a cordon of checking stations will be established. At important geographic points on all travel routes leading to the Rouyn-Boischatel region there will be officers who will make out lists of all persons going in or out. Everyone will have to show his permit and baggage will be searched for firearms. These officers will be special provincial constables and they will also act as game-wardens.

The system of issuing permits to travel in the forest, instituted last summer, is claimed to have been an efficient method of keeping watch on persons entering the forest, and of fixing responsibility in case of bush-fires. This regulation has again been enforced this year by a recent order-in-council. It provides that, between April 1st and November 15th, everyone entering and travelling about in the forest must first obtain a permit. Holders of prospectors' certificates are exempted from this formality, as this certificate is sufficient proof of one's business on lands, the mining rights of which belong to the Crown.

## ONTARIO

**LARDER.**—As a result of some criticism recently directed against the Argonaut Mine, the directors have had the property examined by two independent engineers, and it is stated that their conclusion is favorable to the property. The milling plant is expected to be in operation in May, and will start on a fifty tons a day basis. It is estimated that the reserves above the 500-foot level constitute a two and a half years' supply.

A recent investigation of the Crown Reserve and Associated Gold Fields properties in the Larder Lake district holds out the hope that this district will have at least two gold producers. According to the information available, the Associated has done 800 feet of drifting on the 250-foot level, of which 600 feet is in commercial ore. The shaft is down to a depth of 500 feet, and work on that level has just been started. On both these properties the vein has a width of over 20 feet, and values are reported to run between \$7.00 and \$8.00. Both companies are talking of 500-ton milling plants. The Associated Gold Fields has had a long and unsatisfactory history, and the company has been subjected to a good deal of well deserved criticism. It has an enormous capitalization and while it is very doubtful if the majority of the shareholders will have much chance of realizing on their investment, they will, if the present development continues, at least have a possibility of some return.

The first diamond-drill hole on the Imerson claim in Larder Lake has had to be abandoned, as the drillers found it impossible to reach bed-rock. The casing penetrate 160 feet of sand and gravel before being given up. The property is under option to A. D. Miles, who represents John Taylor & Sons of London, England.

**QUINZE POWER.**—An interesting event will take place in the Parliament Buildings in Quebec on April 25th, when the Quebec Government will lease, by auction, the upper group of rapids on the Quinze River, which is located a short distance from the Dominion Government Quinze Lake reservoir. These rapids have an estimated capacity of 60,000 h.p. The terms under which the power will be disposed of are interesting, and rather unusual. The power will be leased for sixty years for a minimum annual rental of \$8,000, the power going to the one who bids highest above that price. In addition a special tax of 50 cents a h.p. will be collected for all power exported from the Province of Quebec. The successful bidder must deposit \$15,000 before April 21st, as part of a total of \$75,000, which he will be obliged to deposit as a guarantee of certain performances within a specified time. The development of the power must be started within eight months from the date of the signing of the contract, and 20,000 h.p. is to be developed within four years. There has recently been a good deal of speculation with regard to this power, and it is stated that the Hollinger is interested and may be one of the bidders. The last annual report of the mining company showed an item for the cost of surveying this water power. The name



of the Northern Canada Power Company has also been mentioned in connection with it, and it is the general belief that power from there will be supplied to Ontario gold mines.

**PORCUPINE.**—The Porcupine mines have suffered a still further cut in power, and are now getting only about 18 percent of their normal requirements. The situation has never been so serious, but the break-up is liable to occur at almost any time, when there should be a surplus of power.

It is understood that Peninsular Mines has made a contract with the Great Northern Power Company for 700 h.p. from the new plant at Indian Chutes. The clearing for the transmission line has already been commenced.

Thompson-Krist interests are endeavoring to raise enough money in England to finance the paying off of their share of the North Crown expenditures. The company is unable to get its property back until this has been done.

The Goldale will sink the main shaft from 500 feet to 1000 feet. Stations will be cut at intervals, but no exploration will be undertaken until the shaft reaches 1000 feet.

At the Vipond, crosseutting is being done at the 400-foot level to try and cut the veins recently located at 1000 feet. It is understood that the results at the 1000-foot level were encouraging, but did not show any extensive shoots of commercial ore.

The West Dome Lake has recently purchased 20 acres from the Ritchie Veteran Claim, adjoining. They have decided to proceed immediately with the unwatering of the mine, and when this has been done the shaft will be continued to the 1000-foot level.

**COBALT.**—At the recent annual meeting of La Rose, the old board of directors was re-elected, without a dissenting vote. The opposition expected from a Toronto mining brokerage firm did not materialize.

Directors of the Nipissing Mine have declared a quarterly dividend of 3 percent, payable April 20th to shareholders of record March 31st.

**KIRKLAND.**—Directors of the Wright-Hargraves have announced that the company will proceed immediately with the doubling of the capacity of the mill, which will bring it up to between 400 and 500 tons a day. Development work has been exceedingly favorable, and justifies the increase in capacity.

## NOVA SCOTIA

**LABOUR LEGISLATORS ADVOCATE RESTRICTIVE MEASURE.**—Not content with the set-back given the small collieries of Cumberland, the labor party has introduced a bill in the local Parliament which, if passed and enforced, would close every little colliery in Cumberland and hit some of the others in Cape Breton an almost deadly blow. The bill calls for travelling roads 6 feet high and 5 feet wide. On its face it has a semblance of reason but no one knows better than the miner, except it be the coal operator, that the cost of making travelling roads of these dimensions will prohibit the mining of the thin seams. Where the coal seam is 6 feet thick the travelling road must be 6 feet high, and where the seam is 5 feet thick the travelling road can be 5 feet high. Here there is no hardship. But where a seam is say 4 feet six inches thick, there is added cost through the blasting of roof rock. Once broken,

some of this rock falls three or four feet high and sometime higher. Seams thinner than this are at a still greater disadvantage, for besides the cost of blasting there would not be sufficient storage for the rock and it would require to be loaded and sent out of the mine.

**COAL MINING LAWS NEED REVISION.**—That the mining laws of Nova Scotia need to be changed to conform to the new conditions of coal mining is apparent to all who have any knowledge of them or experience in trying to live up to them. Originally they were patterned after the British mining laws, but of late years much has been copied from the mining laws of Pennsylvania. There is no analogy between the conditions of mining in that state and in our Province. The seams of Pennsylvania are nearly all high and lie almost level. Nova Scotia has no level seams, and many that lie at a steep angle. It has a large number of thick seams, but also many thin ones. On the other hand in Britain many thin seams are mined. British miners have had a long experience with such seams at great depths and steep pitches. But while the British mining laws have been models for safety and protection, yet the coal owners have not been hampered in making progress.

A revision of the law must be made before the undersea areas can be properly won. Indeed, present laws governing the undersea districts were all made without experience. Fear of the sea breaking in from some old river bed was the directing motive, and there has been no attempt since then, in spite of all that has been learned, to make these laws practical as well as in the interests of safety.

The laws governing the employment of labor also need revision. Some of them are out of date and others are distinctly anomalous.

## BRITISH COLUMBIA

**ANACONDA HAS OPTION ON MARBLE BAY MINE.**—About a week ago it was reported that the Anaconda Copper Co. was preparing to enter the mining field of British Columbia. This has since been confirmed, reliable reports stating that the Montana company have secured an option on the Marble Bay Mine, Texada Island, and that the intention is to unwater it immediately, preparatory to proceeding with further development. It also is stated authoritatively that the same company is negotiating with a view to obtaining control of the Van Anda Gold Copper Mining Co's, holdings. These are situated adjacent to the Marble Bay Mine and include the Copper Queen, Cornell, Little Billie, and Security.

With the resumption of operations there will be a revival on Texada Island, where industry has been dormant since early in 1921, when work ceased. Up to that time, since 1898, the Marble Bay Mine was a regular producer of copper-gold-silver ore, the copper being chiefly of the bornite variety. Previous to the closing down of the mine a body of ore was discovered by diamond drilling below the 1700-foot level or about 1600 feet vertically below sea level. The management had made arrangements to extend the incline winze already sunk below the 1600-level from near the face of the northwesterly drift on the 1500-level to the new discovery; but the price of copper remained too low to warrant the extension of the workings at that time.



This, it is understood, is what the Anaconda Copper Company proposes doing as soon as the mine and plant have been put in condition. In fact it is given out that the Company is making a close examination of the whole situation with a view, should the possibilities prove sufficiently promising, to establishing the industry to assure the maintenance of output.

**SANDON.**—The American Boy Mine, Sandon, which has been under development for some months, is reported to have 30,000 tons of silver lead-zinc ore of a good grade on the dump, together with some 60,000 tons of first-class milling ore blocked out. The owners have acquired a number of adjoining properties. It is said that in No. 7 tunnel six feet of ore has been uncovered that will average better than 65 percent zinc and 8 ounces silver. At the face of No. 7 tunnel, 800 feet from the portal, it is understood that a blind contact vein, six and one-half feet wide with distinct walls and in a real porphyry formation has been found. Samples have been taken from this running 210 ounces silver and 70 percent lead. This vein has been drifted on for 30 feet. The Company is planning the installation of a tramway and a mill.

**A "POOR MAN'S MINE".**—The Victor, a Slocan property situated near the Wonderful and Monitor Mines, is described as the district's finest example of a "poor man's mine." One car of ore, shipped during the winter, is reported to have given a return of \$5,000. Two men are engaged in stripping and it is estimated that there is \$50,000 worth of ore in sight.

**BRISCO.**—Several cars of ore have shipped to the Trail Smelter from the Steele group, situated on Toby Creek in the Kootenays. This property is being systematically developed by its owners, the Alice Arm Holdings Co., of Vancouver. As a result of recent tunneling and drifting a shoot of "steel" galena, averaging sixty-eight ounces of silver and 82.5 percent lead, has been proved. There also have been uncovered substantial bodies of ore of lower grade. The grade of what has been shipped was from twenty-five to thirty ounces of silver and 35 percent lead. A tramway 1200 feet in length has been installed. Needed improvements have been made to roads and trails with the assistance of the Provincial Government and a bridge has been built across the Columbia River at the town of Brisco, the mine being eighteen miles from this station on the Kootenay Central Ry. New work planned includes the construction of a small mill, while it is proposed that tractors shall be used for hauling ore next winter.

**MORE POWER REQUIRED.**—The West Kootenay Power & Light Co., proposes increasing the capacity of its plant at Bonnington Falls near Nelson from 30,000 to 60,000 h.p. The Company's plant at Grand Forks develops 1500 h.p. One of the principal reasons for this extension is that the Granby Consolidated Mining & Smelting Co. will require additional power for the operation of the plant of the former Canada Copper Corporation which the Company has acquired at Copper Mountain and Allenby the concentrating mill being at the latter point. As the contemplated extension would mean the raising of Kootenay Lake, and probably affect the work now underway of reclaiming the Kootenay Flats, authority is being sought from the Provincial Government and the Company's application is under consideration.

**CANADA COPPER AFFAIRS.**—An order for judgment in

the foreclosure suit of the Equitable Trust Company of New York and the Canada Copper Corporation was allowed recently in the British Columbia Supreme Court, the amount involved being some \$2,800,000. Arrears of interest total about \$300,000. The property will be sold on May 7th, and at this sale it is understood that the Granby Company will be bidders.

P. B. Freeland, resident mining engineer at Grand Forks, a short time ago related the history of Copper Mountain operations and outlined present conditions in the following terms:

"The Canada Copper Corporation, then the B. C. Copper Co., first worked on Copper Mountain in 1905, did some development, and allowed the bond to lapse. In 1911 the same company took options on Voight's claims, adjoining the Copper Mountain group on the north. The Company and Mr. Voight failed to come to an agreement and the options lapsed. Exploratory work on this group uncovered some large copper ore-bodies.

"In 1912 the B. C. Copper Co. again took options on several Copper Mountain claims and did extensive diamond drilling and surface trenching. In the years following, development consisted mainly of tunnelling totaling about 13,000 feet, 6,400 feet of upraises, 936 feet of sinking, 118,000 feet of diamond drilling and 32,000 feet of trenching. The company's holdings on the mountain are 3,192.97 acres.

"The monzonite rocks carry the ore, which consists of chalcopyrite, bornite and pyrite, occupying numerous fractures and also occurring in small grains. The deposition of the ore took place in Jurassic times, and is in part an original constituent of the monzonite rocks and was in part deposited in the fractures by hot solutions or vapors given off by these rocks when they cooled. Within these granular rocks are small masses of highly altered sedimentary rocks (Palaeozoic). These older rocks have been intricately cut by a system of porphyry dikes (granite and quartz porphyry.)

"Chalcopyrite and bornite are the primary copper minerals, associated with hematite, magnetite, and iron pyrites. Some secondary action has taken place in the Helen Gardner claim, distributing chalcocite, native copper, malachite, azurite and cuprite. The main ore-bodies are primary.

"The highly siliceous alumina content is detrimental to direct smelting, and in consequence a 2,000-ton concentration plant has been built at Allenby to treat the ores. A recent review of diamond-drill and development records and an examination of the workings concedes 5,625,980 tons of 1.83 percent copper ore instead of 10,000,000 tons of 1.74 percent copper estimated formerly. The cutting of the estimated ore-reserves from 10,000,000 to 5,635,980 tons is not as serious as it may at first appear. In other words, the probabilities for finding more ore in a deposit of this type are exceedingly good. The property, in spite of all the diamond drilling, has not been as thoroughly prospected as it might have been and when development progresses it is more than likely that additional tonnage will be found and mined.

"The ore-bodies developed lie between an elevation of 3,236 and 4,220 feet, a distance of 984 feet. Some of the drill-holes stopped in ore at the 3,236-foot level. The main haulage level is the 3,170-foot level, or 66 feet below the lowest hole; so the probabilities for



finding more ore at depth appear to be good. The mining of the ore presents some difficulties, inasmuch as the porphyry dikes that traverse the ore zones are generally decomposed and may not stand up under heavy blasting. It is probable that a shell of ore will have to be left on the dikes for protection. The situation is ideal for cheap mining. Ore can be handled by gravity."

**GRANBY INCREASES WAGES.**—An increase of wages at the Anyox Plant of the Granby company took effect on March 16th. Employees whose wages previous to that date were \$4 or over per day received an advance of 50 cents, while those whose wages were under \$4 were allowed an increase of 40 cents. The duration of this new scale will depend on the price of copper.

**TRAIL ORE RECEIPTS.**—Ore receipts at the Trail Smelter for the week from the 15th to the 21st March, totalled 8,603 tons.

The shipments in detail follow:

| Mine                                    | Tons  |
|-----------------------------------------|-------|
| Black Rock, Northport . . . . .         | 165   |
| Company Mines . . . . .                 | 6777  |
| Knob Hill, Republic, Wn. . . . .        | 208   |
| Kootenay Belle, Salmo. . . . .          | 28    |
| Lone Pine, Republic, Wn. . . . .        | 442   |
| Revenge, Beaverdell . . . . .           | 23    |
| Rosebery-Surprise, New Denver . . . . . | 100   |
| Ruth, Sandon . . . . .                  | 44    |
| Sally, Beaverdell . . . . .             | 32    |
| Silversmith, Sandon . . . . .           | 339   |
| Standard, Silvertown . . . . .          | 88    |
| Surprise, Republic, Wn. . . . .         | 209   |
| Steele group, Brisco . . . . .          | 40    |
| White Water, Retallack . . . . .        | 108   |
|                                         | 8,603 |

### AN OLD-ESTABLISHED FIRM

The story of Holmans, the well-known rock drill makers of Camborne, Cornwall, England, has been told in a number of mining periodicals recently, and a very interesting story it is. The firm originated in 1802, when Nicholas Holman began to make steam boilers for the famous Cornishman, Richard Trevithick, who was one of those who helped usher in the age of steam. These "high pressure boilers" were made to withstand 20 pounds to the square inch, and some of them are still preserved in the South Kensington Museum, London.

The manufacture of rock drills was commenced by the grandsons of Nicholas Holman in 1881, and since that time not only has the modern Holman drill been developed to its present perfection, but the original tiny works have expanded to cover 30 acres of ground, with a normal complement of 1,200 workmen.

Holmans use their machines, as well as building them. For 40 years past the firm have carried out drilling contracts, and there is no doubt that this dual rôle of manufacturer and miner has had much to do with the sound and logical development of their line of machines. They have been used principally in Britain and in South Africa, and also in Canada (where Alfred Herbert Ltd., of Toronto are agents), India, Australia, Spain, and indeed in most countries where modern mining methods are in use.

Research work has always been characteristic of the Holman development, and an extensive research de-

partment serves the works today. During the stress of the war period, this department suffered, but now its activities are being renewed and augmented. Compressors, pumps, drill sharpeners and other mining machinery are also made by the firm. As is usual with British firms, quality is always counted the first consideration.

A number of world's records in rapid mining have been made by aid of Holman drills, particularly on the Rand in South Africa.

### INDUSTRIAL ITEMS

The Northern Explosives, Limited, of Dragon, Que., have opened an office in Montreal, where all their many customers and others interested in high explosive are welcome. The factory at Dragon, on the C. P. R. short line from Montreal to Ottawa, where all kinds of high explosives and other blasting accessories can be supplied, is thoroughly equipped to take care of all mining, contracting and road-building requirements. The address of the new office is 623 Drummond Building, Montreal.

The Kaelin Electric Steam Generator is described in Bulletin No. 101, just issued by the Dominion Engineering Works, Ltd., Montreal, and available on request. The 16 pages of this bulletin illustrate and describe the construction, operation and control of this newly devised mechanism, as well as its field of application. Particularly interesting are the data for comparing the costs of coal and the Kaelin generator for raising steam under various conditions.

The Charter Gas Engine Company of Sterling, Illinois, have purchased the Mietz Oil Engine business, heretofore carried on in New York, and will conduct it henceforth at their plant at Sterling. Until this move is completed the service to the many users of Mietz engines will be conducted from the New York plant.



### PURCHASE OF GOLD ORES

The attention of prospectors and others is drawn to the provision in the Mining Act of Ontario authorizing the Department of Mines to purchase parcels of gold ore taken out by prospectors and others in developing or working mining claims. Arrangements have been made by which such parcels of gold ore, whether large or small, will be accepted by the Temiskaming Testing Laboratories at Cobalt, and paid for according to the schedule provided for the purpose. The Laboratories are operated under the auspices of the Department of Mines.

This offers a first class opportunity for testing the value of ores on a large scale, and also of turning ore of good quality into money for carrying on further development work. By special arrangements, on less than carload lots, freight rates on the T. & N. O. Railway are reduced 50 per cent.

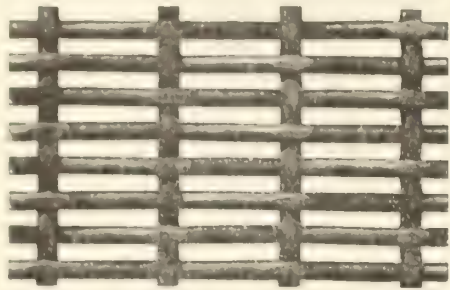
The Laboratories are also equipped for working out the best methods of treatment for gold or silver ores of a refractory or unusual character.

Full information as to treatment charges, schedule of payments, etc., can be obtained from the undersigned, or from A. A. Cole, Manager, Temiskaming Testing Laboratories, Cobalt, Ontario.

THOS. W. GIBSON,  
Deputy Minister of Mines.

Toronto, 12th March, 1923





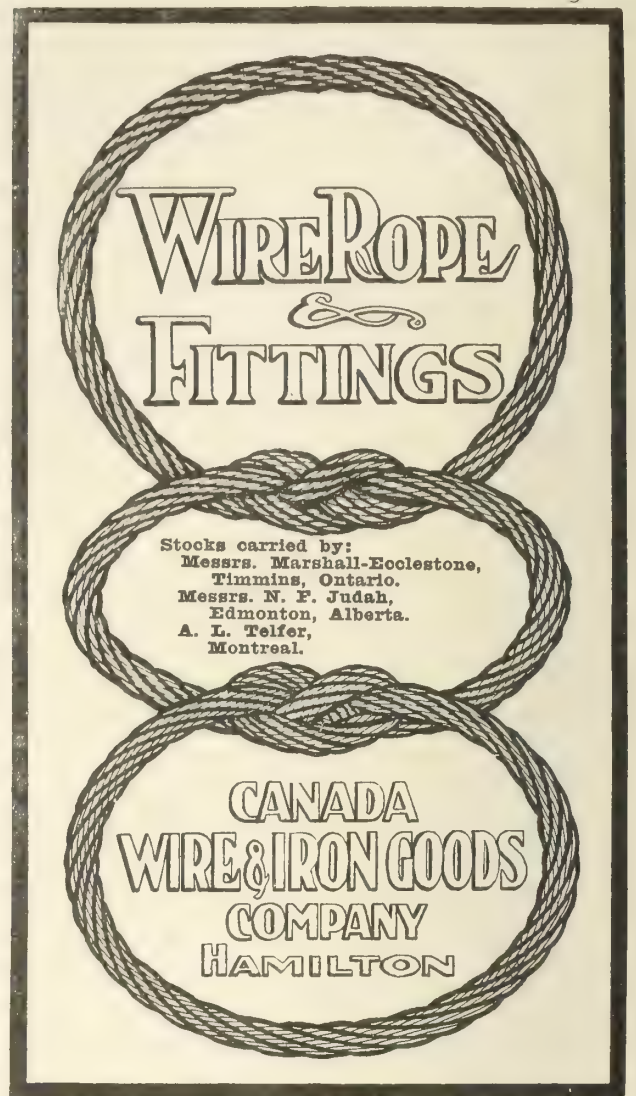
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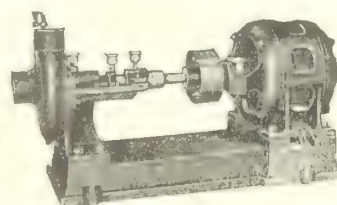
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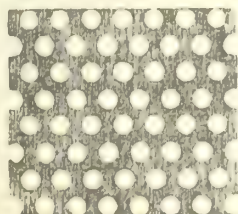
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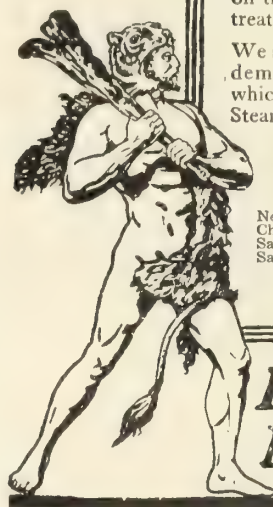
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# PROVINCE OF QUEBEC

## MINES BRANCH

Department of Colonization, Mines and Fisheries

The chief minerals of the Province of Quebec are Asbestos, Chromite, Copper, Iron, Gold, Molybdenite, Phosphate, Mica, Graphite, Ornamental and Building Stone, Clays, etc.

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**MINER'S CERTIFICATES.** First of all, obtain a miner's certificate, from the Department in Quebec or from the nearest agent. The price of this certificate is \$10 and is valid until the first of January following. This certificate gives the right to prospect on public lands and on private lands, on which the mineral rights belong to the Crown.

The holder of the certificate may stake mining claims to the extent of 200 acres.

**WORKING CONDITIONS.** During the first six months following the staking of the claim, work on it must be performed to the extent of at least twenty-five days of eight hours.

**SIX MONTHS AFTER STAKING.** At the expiration of six months from the date of the staking, the prospector, to retain his rights, must take out a mining license.

**MINING LICENSE.** The mining license may cover 40 to 200 acres in unsurveyed territory. The price of this license is Fifty Cents an acre per year, and a fee of \$10.00 on issue. It is valid for one year and is renewable on the same terms, on producing an affidavit that during the year work has been performed to the extent of at least twenty-five days' labour on each forty acres.

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The attention of prospectors is especially called to the territory in the North-Western part of the Province of Quebec north of the height of land, where important mineralized belts are known to exist.

**PROVINCIAL LABORATORY.** Special arrangements have been made with POLYTECHNIC SCHOOL of LAVAL UNIVERSITY, 228 ST. DENIS STREET, Montreal, for the determination, assays and analysis of minerals at very reduced rates for the benefit of miners and prospectors in the Province of Quebec. The well equipped laboratories of this institution and its trained chemists ensure results of undoubted integrity and reliability.

The bureau of Mines at Quebec will give all the information desired in connection with the mines and mineral resources of the Province, on application addressed to

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### Aggregate Value of \$734,259,619

The substantial progress of the Mining Industry of this Province is strikingly exhibited in the following figures, which show the value of production for successive five-year periods: For all years to 1895, inclusive \$94,547,241; for five years, 1896-1900, \$57,605,967; for five years, 1901-1905, \$96,509,968; for five years, 1906-1910, \$125,534,474; for five years, 1911-1915, \$142,072,603; for 5 years 1915-1920 \$189,922,725; 1921, \$28,066,641; for the year 1922, \$35,158,843.

### Production During last ten years, \$339,280,940

Lode-mining has only been in progress for about twenty-five years, and not 20 per cent. of the Province has been even prospected; 300,000 square miles of unexplored mineral bearing land are open for prospecting.

The Mining Laws of this Province are more liberal and the fees lower than those of any other Province in the Dominion, or any Colony in the British Empire.

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Absolute Titles are obtained by developing such properties, the security of which is guaranteed by Crown Grants.

Full information, together with Mining Reports and Maps, may be obtained gratis by addressing.

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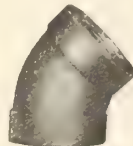
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The fittings have a large safety factor and will safely withstand all operating strains.

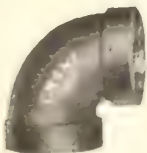


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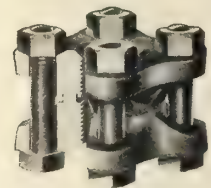


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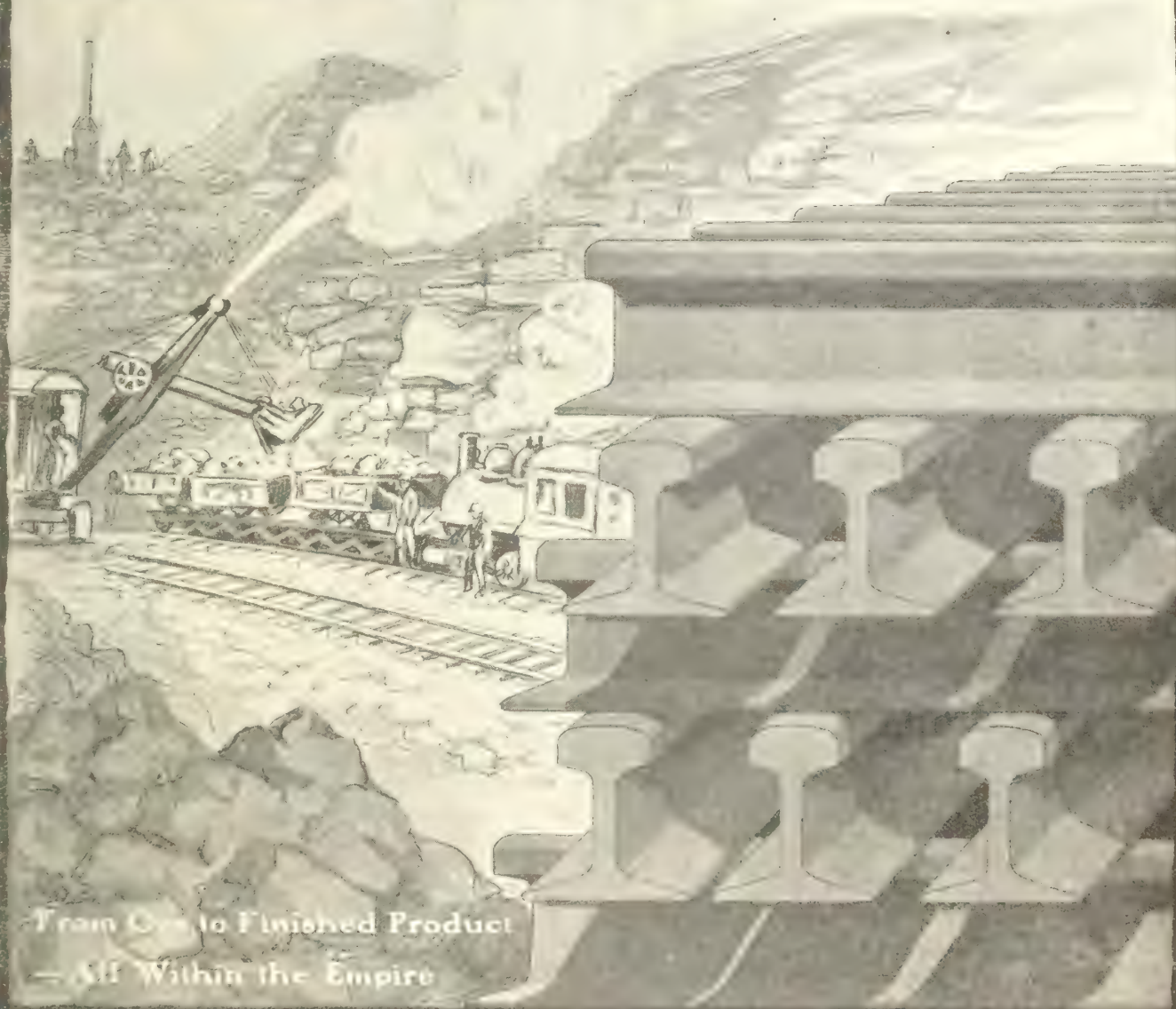
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# Ontario's



# Minerals

PROVINCE OF ONTARIO

DEPARTMENT OF MINES

HON H. MILLS, Minister of Mines

## Mineral Areas.

Ontario, with its 407,262 square miles, contains many millions of acres in which the geological formations are favorable for the occurrence of minerals, 70 per cent of the area being underlain by rocks of pre-Cambrian age. The phenomenally rich silver mines of Cobalt occur in these rocks; so also do the far-famed nickel-copper deposits of Sudbury, the gold of Porcupine and Kirkland Lake, and the iron ore of Magpie and Moose Mountain mines.

## Economic Minerals.

In addition to the above, practically all economic minerals (coal and tin excepted) are found in Ontario:—actinolite, apatite, arsenic, asbestos, cobalt, corundum, feldspar, fluor-spar, graphite, gypsum, iron pyrites, lead, mica, molybdenite, natural gas, palladium, petroleum, platinum, quartz, salt, talc and zinc. This Province has the largest deposits on the continent of talc, feldspar, mica and graphite.

Building materials, such as ornamental marble, limestone, sandstone, granite, trap, sand and gravel, lime, portland cement, brick and tile, meet every demand.

## Mineral Production.

Preliminary returns show the output of the mines and metallurgical works of the Province for the year 1921 to be worth \$48,128,387, of which the metallic production was \$27,574,202.

The following figures show the rapid growth of Ontario's mineral industry by five-year periods since 1891:

| Year.         | Value.      | Year.         | Value.       |
|---------------|-------------|---------------|--------------|
| 1891 .. . . . | \$4,705,672 | 1906 .. . . . | \$22,388,383 |
| 1896 .. . . . | 5,235,003   | 1911 .. . . . | 41,976,797   |
| 1901 .. . . . | 11,831,086  | 1916 .. . . . | 65,303,822   |

## Dividends.

Dividends and bonuses paid to the end of 1921 amounted to \$23,140,734 for gold mining companies, and \$84,388,185 for silver mining companies or a total of \$107,528,919.

## Mining Regulations.

A miner's license costs \$5.00 per annum, and entitles the holder to stake out in any or every mining division three claims of 40 acres each. After performing 200 days' assessment work on a claim, patent may be obtained from the Crown on payment of \$2.50 or \$3.00 per acre, depending on location in unsurveyed or surveyed territory.

## Assay Office.

The Provincial Assay Office at No. 5 Queen's Park, Toronto, is maintained by the Department of Mines for the free identification of minerals, free assays under the provisions of the Mining Act of Ontario, and also for general assay work as per the Schedule of Charges which may be obtained on application.

## Temiskaming Testing Laboratories

The Department maintains, at Cobalt, an ore sampling and testing laboratory which is now prepared to receive parcels of gold ore from 100 pounds upward, and after sampling and assaying the same to pay to the shipper the value thereof, less treatment charges. The purpose is to afford a market for ores extracted by prospectors and others in developing their mining claims, enabling them to obtain funds which they can use for further work and to report on the most satisfactory method of treatment. Fuller information may be obtained on application to the Manager, Temiskaming Testing Laboratories, Cobalt, Ontario.

## Publications.

For list of publications, illustrated reports, geological maps and mining laws, apply to

THOS. W. GIBSON,  
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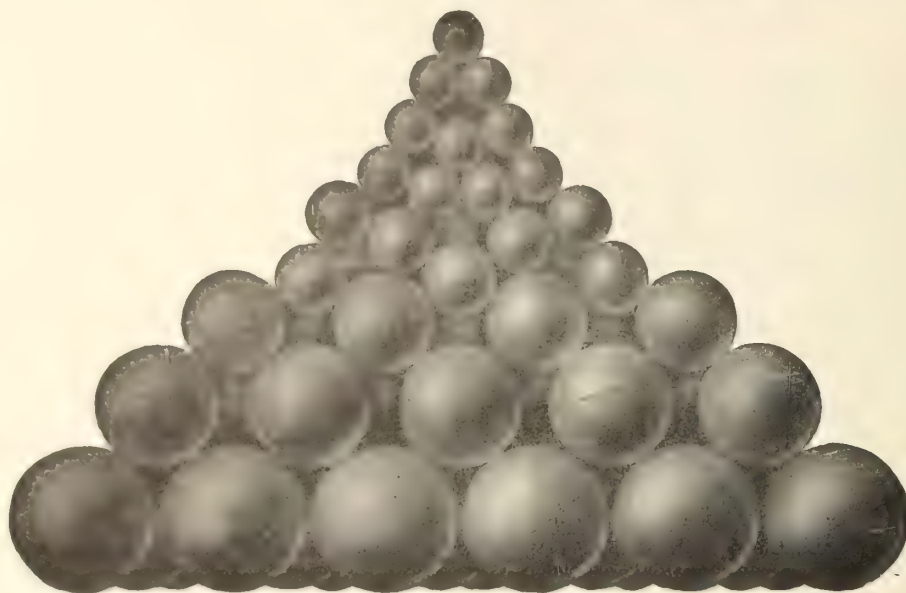
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PUBLISHED WEEKLY

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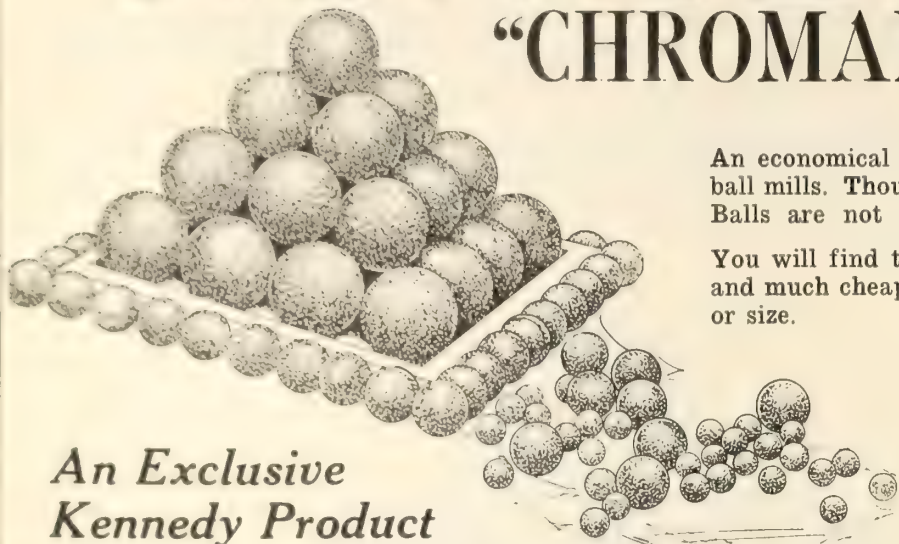
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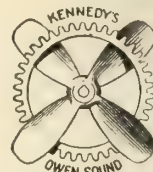
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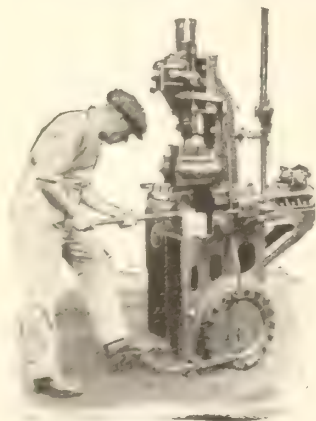
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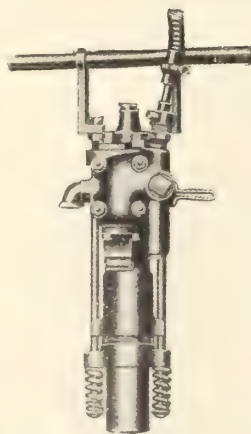
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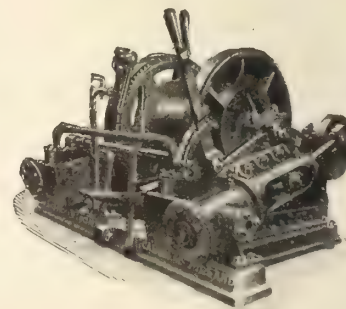
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# :-: EDITORIAL :-:

## MINING ENGINEERS AND THE PUBLIC

"The bank should reach all the small merchants and the small industries. These small industries constitute the power of the nation and in critical times it is always the small savings which save a people. France has given us an excellent example of this.

"This leads me again to warn the small savers against the underhand dealings of men who go about the country and the city offering to sell securities of all kinds. The money goes and there is no guarantee that it will return.

"The Government has often been taken to task for not controlling the sale of debentures. It would be impossible for the government to do this. We might believe that a security was good and recommend it to the public. Events might show us to have been wrong, then what position would we be in with respect to the public? On the other hand we might doubt the safety of a security and of necessity we would condemn it. We might thus block the establishment of an industry which might perhaps be destined to enlarge our national inheritance.

"The best thing to do under the circumstances is, it seems to me, to establish a campaign of education. The people should be more careful and should accept the advice which men in authority offer to them."

These are the words of Premier Taschereau, speaking in Quebec to an audience of bankers and business men. These brief sentences contain a wealth of suggestion, particularly to those interested in the mining industry.

Last week, in discussing the value of well-directed publicity to the mining industry, we dwelt upon the responsibility of the Department of Mines in Ottawa in this regard. This Department is the central and principal source in Canada of technical information, much of which is at present unused or inadequately used for lack of an officer trained in the art of the publicist. This week we shall discuss briefly the responsibility that rests upon the mining engineer or geologist in private practice, as well as upon these same men as assembled in the Canadian Institute of Mining and Metallurgy.

We engineers pride ourselves upon belonging to a genuine profession, equal in importance, if not in prestige, to any other profession. What is a profession? The Century dictionary defines it as "a vocation in which a professed knowledge of some department of science or learning is used by its practical ap-

plication to the affairs of others, either in advising, guiding or teaching them, or in serving their interests or welfare...The word implies professed attainments in special knowledge, as distinguished from mere skill; a practical dealing with affairs, as distinguished from mere study or investigation; and an application of such knowledge to uses for others as a vocation, as distinguished from its pursuit for one's own purposes."

The application of this definition to the old-established professions, theology, law and medicine, is clear. What does it involve for us of this newest of the professions, engineering? How best can we mining engineers uphold the ideals of our profession and enhance its prestige? To answer these questions would be to write a treatise on the ethics and practice of engineering. We shall call attention here only to one point — a point that is of vital importance, but that has nevertheless escaped the notice of most practising mining engineers.

The definition above implies that mining engineering, if truly a profession, must be "used by its practical application to the affairs of others, either in advising, guiding or teaching them, or in serving their interests or welfare;" and again, that it must be "an application of such [special] knowledge to uses for others as a vocation, as distinguished from its pursuit for one's own purposes." The idea of service to others is predominant in the definition of engineering, as it should be in the practice of engineering.

Present-day Canadian mining engineers are, as a whole, notable for the excellence of their services to their employers. Our mines are now, in general, under competent technical direction — a statement that could not have been made truthfully twenty-five years ago. The general public can rest assured that from now on the mines of our country will remain under the direction of men well qualified to develop them economically and to the utmost limit.

So much for the relation between mining engineers and the mines whose destinies they guide. What about the relation between mining engineers and the public whose interests the mines are meant to serve? Frankly, this relation is so vague and indeterminate that one almost doubts its existence. The public knows little about the miners, and their knowledge of the mines comes mainly through the advertisements of mining stock promoters, the mining stock quotations, and the news paragraphs (mostly inspired) in our daily newspapers. The miners, on the other hand,



are content to scoff at the seriousness and credibility of the public opinion question. They are easily dismissed, and aver that it is no concern of theirs that the word "mining" is understood by the public as synonymous with "gamble" and is intimately connected with the word "crook". By this very attitude the mining engineer demonstrates that he is not seriously a member of a profession; and the prevalence of the idea throughout the body of our mining engineers shows that we have not yet elevated our vocation fully to the dignity of a profession.

If we mining engineers are to take our proper place in the community, we must give more regard to the community itself. We must help circulate the truth about our work, in place of the half-truth or falsehood that now bears the name of "mining" in the public press. We must do our best to exterminate the pestilential breed of "wild-cats" that batten upon the flesh of the mining industry. We must make it plain to the public, as it is to ourselves, that the so-called "mining stock exchanges," as at present constituted, are the merest devices for gambling, and bear little or no relation to the genuine mining industry. We must revise our present dependence upon outsiders for the financial management of our industry, in order to make certain of the exclusion of the charlatans that too often pass current for sound mine promoters; business and financial management should be part of the mining engineer's prerogative and duty.

Premier Taschereau has pointed the way of progress to mining engineers as well as to bankers. We shall do well to consider the public oftener and more seriously, in the interests both of ourselves and of our profession.

### THE PROSPECTOR AND FOREST FIRES

A strong indictment of the prospector's fire-setting propensities is contained in the current issue of the "Canadian Forestry Magazine." Mr. J. R. Booth, of Ottawa, the veteran lumberman and paper manufacturer, now ninety-six years old and still hale and hearty, was interviewed by the editor of the "Canadian Forestry Magazine," and as both are interested in the preservation of our forest resources, the conversation naturally turned to forest fires, which destroy more timber and pulpwood each year than is used in all the mills. Mr. Booth charged the prospector with the main responsibility for this destruction. The prospector and those that follow him do set fires at times, but the responsibility must be shared by many others, and the genuine prospector, in our experience, is seldom directly responsible for a forest fire.

"Take, for example, the Montreal River spruce country, a few years ago absolutely green... Well, it was opened to prospectors... To this day, not a mine or a real prospect has been uncovered on that 1700 miles; but a horde of irresponsible men seeking non-

existent mines have destroyed from one-third to a half of that country. They have ruined as much timber as would have kept the Ottawa mills running for twenty-five years... I know the history of some of our forests for seventy-five years, and I am frank to say that I believe every dollar's worth of mineral taken from forested lands has cost the country a hundred dollars in destroyed timber. Why not make a business-like calculation of the price we pay for letting loose the prospector on the country's fast-depleting stock of timber? The showing would make us rub our eyes."

Thus says Mr. Booth, and in the main says truly. He forgets, however, that already several million dollars in silver has come from Gowganda, in the midst of the Montreal River district, and likewise he has exaggerated the importance of lumbering operations in comparison with mining. He has not recollected that last year the nickel, silver and gold camps of the north alone yielded over forty million dollars in real wealth. The production of ten times this amount of mineral wealth would not, however, excuse the wanton destruction of our forests that is now taking place each year.

Seldom is a forest fire started by a genuine prospector. Following the prospector, however, whenever he makes a strike, there comes a drove of hangers-on, many of them irresponsible and most of them lacking the careful habits of the real woodsman. It is then that most of the damage attributed to prospectors is done. In Northern Ontario, as Mr. Booth notes, the damage has been particularly severe from this cause. However, we hear of the ravages of forest fires in other areas and in other provinces where there are no prospectors, — fires quite as extensive and quite as numerous as in Ontario; so the prospector must be held responsible only along with the camper, the settler, and the lumberman himself. From the prevalence of fires in the lumberman's slash and on the borders of settlement, we would judge that these two are the most prolific sources of forest fires.

Is it inevitable that prospecting should be accompanied by forest fires? Certainly it is not. We hope to see a demonstration of this in the new gold district of northwestern Quebec during the coming summer. In spite of the comparative congestion of men in this area and the presence of hundreds of novices in the woods, it is quite possible that the measures to be taken to prevent fires will be effective. The principal means of preventing fires will be to impress upon each and every person entering the woods the fact of his personal responsibility in the matter, and to ensure that this personal responsibility shall be brought home to him in case a fire is started.

In that part of Ontario described by Mr. Booth, the most elementary precautions against fire were neglected. The area was a forest reserve, which left

the whole responsibility with the provincial government, without the stimulus afforded by private proprietorship. The fire-ranging system was a joke, and no special precautions against fire were taken. It was commonly known, for instance, among the prospectors and others in the area that a burned area would be leased for cutting, by the government, in order to make use of the scorched timber before it rotted. Many fires are laid to this account.

At present there is a rising tide of popular interest in our forests, one of whose principal effects will be, we hope, to stimulate their protection against fire. The precautionary measures thus developed will, we are sure, serve as well to protect the prospector not only from the rare temptation to fire the forest for his own selfish purposes, but from the much commoner dangers attributable to those who follow him along the trails he blazes.

### THE ECONOMIC GEOLOGIST

"Economic geology is the application of geology to economic problems," says Dr. W. H. Emmons in his new text-book. As geology "deals with the materials of which the earth is made, the forces that operate upon them, the structures that result from this operation, the distribution of the rocks forming the earth's crust, and the history of the earth itself and of the plants and animals that have inhabited it during the different ages" (Coleman and Parks), the economic geologist has "some job" on his hands.

More and more, the responsibility for directing the development of the mining industry devolves upon the economic geologist. There are few geologists in this country in these days who are not, in part at least, economic geologists. The science of geology and its practical application are so closely connected that seldom can one study the one without practising the other. Thus it happens that the large majority of our geologists in public employ are working directly for the progress of the mining industry, and that an increasing number of consulting geologists are employed privately to direct the efforts and expenditures of those concerned with mining operations.

Though their duties often overlap, the mining engineer and the economic geologist have separate and distinct fields. It is the engineer's duty to mine and treat the ore from his mine economically and thoroughly, to develop his ore-deposits to their limit and to make the best use of them. He will be called upon to explore for new ore-bodies and to find faulted ones; but his mine is his province.

The economic geologist, on the other hand, is usually called upon to direct primary exploration for mineral deposits, to gauge their prospective value when found, and to direct the development that will prove or disprove their economic worth. His is an unusually delicate task, calling both for sound technique and ex-

perience and for intuitive judgment. He must have in unusual degree the strength of his convictions; a timid man cannot make a good economic geologist. He must have gained a sound knowledge of the principles of business and commerce, lest his conclusions while scientifically sound should be economically infeasible.

The present organization of the Geological Survey in Ottawa takes full cognizance of the duties and prerogatives of its geologists, as well as the direct bearing of their work on the development of the mineral industry. This is indicated clearly by the fact that each of the staff has been assigned a specialty to follow, this specialty usually coinciding with a mineral or group of minerals of economic importance. Of recent years, too, the responsibility that rests upon geologists for leadership in the development of our mineral lands has been met in growing degree by the officers of the Geological Survey. Frank discussion of the geological problems encountered in the proved and prospective mining camps is the order of the day in recent geological reports, and unequivocal conclusions and practical directions to miners or prospectors are included wherever possible.

Dr. H. C. Cooke's article on the new gold area of northwestern Quebec in last week's "Journal" is typical of this development. Dr. Cooke is the Geological Survey's specialist on gold-bearing formations in the pre-Cambrian rocks. In Larder Lake, Matachewan, northern Manitoba, Kirkland, Porcupine, and now in Quebec he has studied the problem of where, how and why the gold occurs. His aim is to convert accurate observations of fact into principles that will guide exploration and aid discovery. In his article he states the facts of this particular case clearly and on them bases conclusions of practical interest to the prospector. These directions for exploration are so clearly and simply stated that they cannot fail to direct the efforts of many of the hundreds of prospectors that will enter the district within the next six weeks.

We are confident that Dr. Cooke's effort on behalf of these toilers in the northern forests will be repaid a thousand-fold. It will serve to crystalize the opinion of other geologists and mining engineers engaged in the field whose experience and outlook have been more restricted than his own. It will direct the bulk of the effort where the chances are best, though it will not prevent a wide-spread search. This will represent a vast saving of time and money that otherwise would be dissipated uselessly.

Just as the well-advertised fact, a year ago, that the Director of the Geological had decided to map carefully this promising gold area in Quebec stimulated a search there by prospectors, so in the present instance will Dr. Cooke's report direct attention where it is best warranted. The geologist once more is proving himself a leader in the development of the mineral industry.



### MINING SOCIETY MEETING

The annual meeting of the Mining Society of Nova Scotia, held this year in Halifax, has been lively and prolific of fruitful technical discussion, as usual. The members of the Society compose a closely-knit fraternity, held together by the bonds of personal acquaintance and friendship as well as by the essential unity of their various occupations in the great coal and steel industries of the province.

There was discussed at some length at one of the sessions the relations between the Canadian Institute of Mining and Metallurgy and the Mining Society. There is no doubt that the present affiliation of these two societies is beneficial, not only to themselves but to the mining industry of Canada as a whole. It is, therefore, very satisfactory to find that a committee representing both organizations has been formed to examine into the various questions of common concern on which there is at present a difference of opinion, and to effect or recommend such adjustments as may be found to be necessary. The aims and objects of the two societies are essentially the same, and no trivial differences must be allowed to come between them.

Mr. George W. MacLeod's description of the Goudreau gold area, which appears in this issue, is an authoritative and unbiassed account of this promising area. Mr. MacLeod has conducted his professional activities as a mining engineer in the area during the past two years, and what he states of the various properties he knows from personal observation.

### LETTERS FROM READERS

#### Golddale Geology

To the Editor.

Canadian Mining Journal,

Sir:

A news item on the Golddale operations at Porcupine, in your issue of April 6th, states that "Geologists seem to be of the opinion that the McIntyre section is covered by a lava cap and that greater depth offers excellent possibilities". When it is considered that these items are widely copied in technical publications, it is unfortunate that a false impression should be given of the structure of the Keewatin area. Recent surveys by Mr. Burrows of the Provincial Survey indicate that the lava flows in this particular section are essentially vertical, having been tilted into that attitude by post-Temiskaming folding. Development in the McIntyre Mine to a depth of 2400 ft. proves this to be the correct assumption.

The Golddale has decided on a program of deep level exploration, it seems to me, on other grounds, connected with the structure of the intrusive porphyry and governed by the generally accepted hypothesis of genetic relationship between the intrusive porphyry and the ore-deposits. The favorable results secured on the 500 ft. level may reasonably be expected to continue to or improve at lower horizons. The 500 ft. level ore-body, however, can be traced on the surface, where economic values are less in evidence. There is no cap-

ping of lava. The Keewatin lavas are older than the period of vein formation. The dips of the lava beds are usually steep but even flat dips would hardly limit the extension of fractures through flows.

Considerable work is in progress on the structure of the Keewatin, both by the Government Survey and mining companies, and a more general dissemination of the results of this work is to be expected in the near future.

Schumacher, Ont.

H.S. Robinson

### THE LATE ALEXANDER DICK.

The mining industry of Canada has lost a faithful servant, the British Empire Steel Corporation a trusted employee, and a large circle of Canadians a friend of sterling qualities and most amiable disposition in the passing of Alexander Dick. Mr. Dick died suddenly, of heart failure, in New York on April 12th while on a business trip there. He has died before time for he was but fifty-nine years old and was in the midst of a useful business career.

Mr. Dick was born in Stellarton, Nova Scotia, in 1864. He was brought up in the coal business, so to speak, and rose from one position to another in the services of this basic industry of his native province until last year he was appointed sales manager for the Dominion Coal Company, and resided in Montreal.

Wherever Mr. Dick went, he made a host of friends. His genial qualities were irresistibly attractive. The funeral service held in Montreal, though ostensibly private was attended by scores of Montreal's prominent business men, anxious to pay their last respects to a man whose personal regard was held high among them. The burial was at Stellarton.

Mr. Dick is survived by his widow and his daughter, to whom the "Canadian Mining Journal" offers its sympathy.

### ANAMORPHOSIS

The clothes he wore were ancient, awful;  
They were more dirty than is lawful.  
His boots, each like a youthful crate,  
Were in a truly wretched state.  
His chin unshaven, hair unshorn,  
Lent him an aspect all forlorn.  
As if to paint the lily, too,  
His jaws were working on a chew.  
I sized him up as merely tramp,  
Whose job it was free meals to vamp.  
My trust in my perception's shaken:  
For I was utterly mistaken.  
A government official, he  
Was also B.A., B.Sc.  
So far was he removed from tramp  
His word was law throughout the camp.  
Respected much and liked he was,  
And this assuredly with cause.  
But my first instinct was to dip  
Into my pocket for a tip!  
I sometimes think there would have been  
A singularly painful scene  
Had I assumed the moral onus  
Of eleemosynary bonus!

J. C. M.



# THE GOUDREAU GOLD AREA

By G. W. MACLEOD\*

## Location

The Goudreau Gold Area is located in the Sault Ste. Marie Mining Division, District of Algoma, Ontario. It lies almost immediately south of the C.P.R. between Missinaibi and Franz. The Algoma Central Railway, running north from Sault Ste. Marie, travels through the center of the field. Roughly the area is twelve miles in width and thirty miles in length. It extends from Dog Lake on the east, in a south-westerly direction to the Magpie River. In width it extends from mileage 170 to mileage 182 on the A.C.R. The limits of the gold-bearing area, however, are by no means established.

In addition to the above railway facilities, all parts of the camp are easily reached by water routes, the entire area being studded with lakes. Last summer the provincial government built an excellent road from the A.C.R. at Goudreau Station to the property of the Goudreau Gold mines, Ltd., a distance of five miles.

A part of this area is owned by the Algoma Central Railway Co. The regulations pertaining to these lands are identical with those of the Ontario Mines Act, except as follows:—

The miner's license costs only \$1.00

Claims, work etc. are recorded at the office of the Railway Company's Land Department.

The following royalty on gold is charged

2% of the value of the output up to \$1,000,000

3% of the value of the output from \$1,000,000 to \$4,000,000

5% of the value of the output over \$4,000,000

## History

Gold was discovered first by W. J. Webb in the spring of 1918, on what is now known as the McCarthy-Webb Property. Mining activities had been carried on for some years previous to this date on the large deposits of pyrites that exist in this section and all prospecting and exploration work done during these years was with the idea of locating either iron ore or pyrites. With the discovery of gold, however, the activities of prospectors were at once directed towards this metal. Staking was largely confined to townships 48 and 49 along the C.P.R. and a number of promising finds were made.

In November, 1920, a discovery was made near the north shore of Godin Lake, in Township 47 and since that date many claims have been staked in this township.

In April, 1921, a spectacular find was made by Thos. Murphy and Jas. Perry in the central part of Township 28, Range XXVI. Following this discovery several hundred claims were staked, covering all this township and parts of the adjoining townships.

As new discoveries were made and the staking around them spread, the various groups of claims became connected and at the present time there is a continuous line of claims, which varies from one to six miles in width and extends over a distance of twenty-five miles.

## Topography

The general topography consists of a series of low parallel ridges with sandy or marshy ground between them. The general strike of these ridges is east and west. A few, however, run north and south. Only one or two of these ridges reach a height of seventy-five feet above the level of the surrounding country. The average elevation of the area above sea level is about 1,200 feet.

The whole country in this vicinity has been burnt over and there is little good timber except in the swamps and along the streams. The northern section is largely sand plain, the growth consisting of young jackpine. With the exception of the ridges and higher ground the rock is covered with sand and gravel. Generally this covering is not deep, but it is responsible for the fact that the discoveries, almost without exception, are confined to the better exposed ground.

## Geology

A large proportion of the rocks in this area are the old Keewatin volcanics. This formation is made up of many successive flows of both the basic and acidic phases of the predominant rock of this period. Between some of these flows there are bands of iron formation, which vary in width from a few inches to many feet. These bands consist chiefly of pyrites, siderite, silica, and iron oxides. They are especially prevalent in the section east of the A.C.R. A common mistake made by those unfamiliar with this formation is to take these various bands, especially the silica, for veins. To one unaccustomed to this or a similar area this mistake is easily made. Many thousands of dollars have already been spent in this district by men who have made this mistake. While it is too broad a statement to say that this formation does not in some instances carry gold values, at the same time experience in this field has shown that it is not productive in any instance known at present of anything approaching commercial gold values. When samples taken from this formation show gold values, close inspection of the places where they were taken shows that small quartz veins of later origin, cutting the iron formation, have been responsible for the gold.

Both the volcanics and iron formation have been tilted to an angle that varies from 20 to 90 degrees. They have been intruded by granite, quartz and quartz-feldspar porphyries, and diabase dykes. The chief gold values have been found in veins or shear zones in the vicinity of either the granite or the porphyries. The diabase dykes are of two varieties, the older, quartz diabase and the younger, olivine diabase. Those of the latter type are the more numerous. Faulting of considerable magnitude sometimes accompanied the intrusion of the older dykes and in one instance a displacement of 3,000 feet was noted by W. H. Collins, of the Geological Survey, Ottawa, who gives an excellent description of these dykes as well as the geology of part of this field in his report of 1918.\*\*

This belt of Keewatin Volcanics is bordered both on

\* Mining Engineer, Sault Ste. Marie, Ont.

\*\* Geological Survey of Canada Summary Report, 1918, Part F



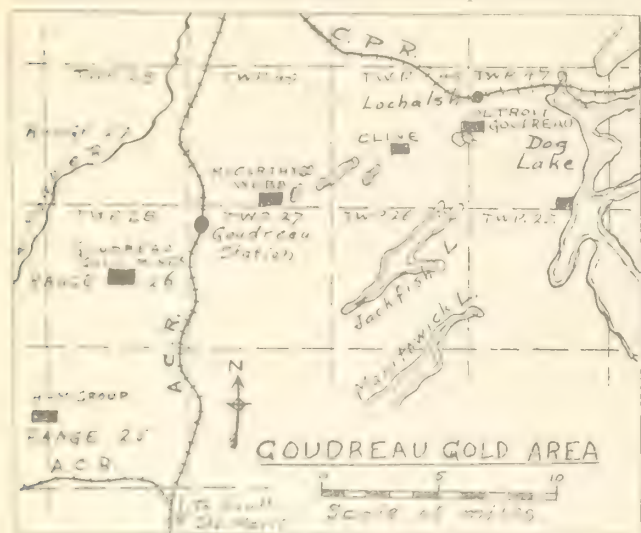
The north and south by large intrusions of granite and acidite masses.

### Description of Properties

#### McCarthy-Webb

This property consists of a group of seven claims located in the south central part of Township 49. It was been examined and reported on by several engineers and a description is included in the geological reports of W. H. Collins,\*\* Ellis Thomson\*\*\* and A. G. Burrows\*\*\*\*.

The gold values are found in quartz veins in shear zones in a wide band of quartz-felspar porphyry. The majority of these veins are narrow and are irregular in extent. There are, however, a large number of them and nearly all carry gold values. There are two sets of veins. The older and most important run with the schisting, i. e. east and west. The other set cut these at right angles. Free gold is visible in many places and good results have been obtained in several places over mining widths. In some instances veins are so close together that they could be mined in one operation. The chief difficulty up to the present is that work on this property has not been concentrated sufficiently to determine the extent of these most important sections.



(Note — Emily Mine is on the shore of Dog Lake)

A large part of the claim is heavily drift-covered and further exploration could be carried on more intelligently by diamond drilling than by further surface work.

The work so far has been confined to the exposed or lightly covered portions, and consists of stripping, trenching and sampling. Tourmaline and pyrite occur in both types of veins.

A good wagon road connects this group with the railway at Goudreau Station. The property is at present under option to a London Mining Syndicate, whose engineers examined it last summer.

#### Michael (Godin Lake) Property

This property (marked Detroit Goudreau on the map) consists of a group of four claims located near the north shore of Godin Lake in Township 47. It is two miles south of the C.P.R. at Lochalsh and is connected to that station by a fairly good road.

The gold values are found in quartz lenses in an ex-

tensive shear zone in a basic volcanic flow. This shear zone is intruded by irregular masses of quartz porphyry and it is in the vicinity of these intrusions that the best values are found.

The shear zone has an average width of 125 feet and has been traced for a distance of 1,000 feet. Gold values are found in practically all parts of this zone and samples taken run from \$0.60 to \$19.00. The higher values are in the quartz lenses and the schist immediately associated with them. The largest of these enriched zones so far uncovered has an average width of seven feet and has been stripped over a length of about 100 feet. The average value here is slightly over \$8.00. The zone has been impregnated with carbonates and the surface shows the characteristic weathering of iron carbonate. In addition to these minerals the schist and quartz contain pyrites, chalcopryite and small amounts of galena. The gold is finely divided and no free gold is visible.

The extent of the mineralization in the known part of the shear zone offers good possibilities for the existence of enrichments of commercial size and value.

The property is under option to the Detroit-Goudreau Gold Development Co. of Windsor. Camps are being erected and diamond drilling will be commenced this month.

#### Goudreau Gold Mines, Ltd.

This company was organized to take over a group of twelve claims located in the central part of Township 28 Range XXVI. The company is capitalized at \$2,500,000, shares being of \$1.00 par value. The owners of these claims received as a purchase price, 1,500,000 shares, which were issued to them as fully paid.

The geology and description of this property is included in the reports of A. G. Burrows 1921, and Ellis Thomson, 1921.

The vein on the surface varies in width from one to ten feet and free gold is visible in many places. An up-to-date mining plant has been installed, including a compressor, two hoists, blacksmith shop equipped with a sharpener, assay office, camps, office, etc. Electric power is obtained from the hydro-electric plant at Steep Hill Falls on the Magpie River.

Two shafts, five hundred feet apart, have been sunk on this vein and these shafts have been connected by a drift on the two-hundred-foot level. This drift has been extended in both directions so that its total length on this level is about 1,000 feet. Free gold was encountered in many places during the sinking of the shafts. At present one of these shafts is being sunk to the four-hundred-foot level and when this is completed the company intend to carry on the same exploration work as was done on the two-hundred-foot level. It is not expected that plans for a mill will be considered until conditions on the 400-foot level are known.

During last summer the provincial government built an excellent road connecting this mine with Goudreau Station, a distance of five miles.

#### Emily Mine

This property, located in the southern part of Township 47, was at first not considered to be in what was strictly the Goudreau Area. It lies about fifteen miles east of Goudreau Station and a considerable distance separated it from the Goudreau claims. In the past few years, however, discoveries have been made and claims staked in this direction so that almost a continuous line of claims now connects it with Goudreau.

\*\* Geological Survey of Canada, Summary Report, 1921, Part D.

\*\*\* Canadian Mining Journal August 5th, 1921, p. 621.



It was discovered in 1901 and during the years 1901 and 1902 the owners (now the Algoma Steel Corporation) sank a shaft to a depth of 56 feet and put down three diamond drill holes. Owing to financial conditions, all operations were suspended in 1903 and have not been resumed.

Definite information as to the value of this property is lacking, but from a milling test of four and one quarter tons of ore, a recovery of \$30.16 per ton was made and \$18.00 per ton remained in the concentrate and tailing. About \$18,000 was spent in the development work. A sample taken by the writer in 1918 from the vein across three feet gave \$44.00 in gold. Most of the surface trenches and pits are filled in, but it would appear that the vein, of rusty quartz, is at least four feet wide and extends for several hundred feet.

Several attempts have been made to option this property from the present owners, but without success.

### Cline Group

This group is located in the central part of Township 48, and is among the early discoveries in the camp. There are several quartz veins, some of which contain visible gold. On one of these veins a pit has been sunk to a depth of 25 feet.

Most of the veins are narrow but one or two are several feet in width. A large part of these claims is heavily drift-covered and it is difficult to trace the veins any distance. Sufficient work has not been done as yet to determine the value of any of the present discoveries.

### Morrison (Cabin Claim)

This claim is owned by the Algoma Exploration and Development Company of Sault Ste. Marie. It is located on the north shore of Goudreau Lake in the south west corner of Township 49.

Free gold is visible in narrow quartz veins in a rusty shear zone. As with the Cline property, this claim is drift-covered and work is carried on only with difficulty. This discovery, while it has promise, has not been traced far enough to enable a statement to be made as to its value.

In addition to the properties mentioned above, there are many claims on which promising discoveries have been made but on which not enough work has been done to prove their value.

Among these are McCormick, Fuller-Black and McCaul in Township 48, Banville, Page and Gutscher groups in township 28 Range XXVI, and the Myhill-Hasselbring claims in Townships 28 and 29, Range XXV.

Several syndicates have been formed to exploit some of these discoveries and considerable activity is anticipated in this camp during the coming season.

Aside from the favorable geological conditions that exist in this area, the camp has many things in its favor that are seldom found in new camps. It is made easily accessible by two railroads, one of which, the A.C.R., runs through the heart of this field, no part of the area being more than seven miles from either one or other of the railways. Cheap electric power is already available to many parts of the camp and could be easily extended to any required point in a short time. There are two hydro-electric powers already developed, which can furnish 2,500 horse-power. One of these plants has sufficient reserve to allow for the development of 30,000 additional horse-power.

Roads are already constructed through part of the camp.

Accurate geological information is available from reports by competent government geologists, a geological map of the district is being made at the present time and should be available shortly.

Exploration work carried on in this field under competent supervision and planned on a sound basis is a legitimate undertaking and is well warranted. The present discoveries indicate the probability of another camp being added to the list of Northern Ontario's gold producers.

### COMPARISON OF FATALITY RATES FOR PITCHING COAL SEAMS AND LEVEL SEAMS.

That the hazards of coal mining are greater in pitching seams than in level workings is indicated by a comparison of the accident experience of the anthracite mines in Pennsylvania with that of the bituminous mines in the same State, made for the United States Coal Commission by W. W. Adams, statistician, Bureau of Mines. Moreover, the difficulties attending mining in the anthracite field, where most of the beds incline considerably from the horizontal, result in a smaller production of coal per employee underground than in the bituminous region where nearly all of the mines are level or of a gentle dip.

During the 11-year period, 1911-1921, the number of fatal accidents in properties to the number of men employed underground was 40 per cent greater in anthracite mines than in bituminous mines. During the same period the anthracite employee averaged only two-thirds as much coal per day as the bituminous worker. It should be stated, however, that since May 1916, the 8-hour day has prevailed in the anthracite field, while prior thereto the 9-hour day was the standard; in the bituminous field most of the men have been employed on the basis of eight hours per day since 1917, but before that year many of them had been employed on the basis of nine and ten hours per day.

The accident experience of the anthracite and bituminous fields of Pennsylvania may be compared with peculiar propriety because the laws relating to the classes of mines, although necessarily differing in some respects, have been uniformly interpreted and enforced by a single department of the State government. In other words, differences in State policy or in law enforcement, which may sometimes constitute an intruding factor in comparisons between mines located in different States, do not enter into a comparison between the anthracite and bituminous mines of Pennsylvania.

During the eleven years 1911-1921, the accident rate at anthracite mines in Pennsylvania was 5.056 per thousand men employed underground as compared with 3.588 at bituminous mines in that State. The actual number of fatalities underground and in shafts was 5,635 at anthracite mines and 4,588 at bituminous mines.

The 1923 prices for the Lake Superior iron ores are 50 cents a ton in advance of those of last year. This may have a beneficial effect in helping to stimulate the production of iron ore in Ontario, where the only serious obstacle to the mining and beneficiation of native ores is the enhanced cost of the product.



# The Matachewan Series and its Pre-Cambrian Relations

In northeastern Ontario, as is well known, the pre-Cambrian consists of a great variety of both igneous and sedimentary rocks that represent a vast period of time. In this region are also to be found some of the world's greatest gold, silver and nickel deposits. The age and structural relations of the rocks have been closely studied during recent years chiefly owing to their bearing on economic problems, and it has been found that owing to the variety of ore occurrences it is necessary to have a more detailed knowledge of the rocks than is necessary in most regions if prospecting and mining problems are to be satisfactorily solved. There is need of a knowledge of what rocks are genetically or structurally connected with certain ores and those that are not. For example, an older series of sediments, the Timiskaming, is found to be structurally related, at least, with the occurrence of gold deposits that are now productive, and certain acid rocks are genetically related to the same deposits. On the other hand, a newer series of sediments, the Cobalt series, is younger than the gold deposits, but in it has been found a high percentage of silver ores. The silver deposits are genetically connected with certain diabases, the Nipissing series, that occupies large areas in the region.

It is difficult to distinguish certain igneous rocks from others that may be either younger or older, unless they are found in contact with rocks whose ages are known. The same may be said of certain sedimentary rocks of the region. But for economic reasons it is necessary to determine if possible the age relations. Prospectors, for instance, have spent time in searching for silver deposits in diabases that they mistook for the Nipissing diabase but which were really of much greater age. Similarly, older porphyries have been mistaken for the newer, that are associated with gold deposits.

A good example of a series of older diabases that have in one or two areas, at least, been mistaken for the newer Nipissing diabase is recorded by Mr. A. G. Burrows in his reports on the Matachewan and Gowganda areas. Speaking of certain diabase in the latter area, this author says:

## Post-Algonian and pre-Cobalt Series

"Diabase occurs abundantly in parts of the area. The Keewatin and the intrusives (granites, syenite and porphyry) are cut by numerous dikes of diabase; whereas in the rocks of the Cobalt series these dikes are quite rare. In the vicinity of the Davidson claims there are several dikes of diabase that lie unconformably below the basal conglomerate of the Cobalt series. These dikes intrude the orthoclase porphyry that has been classed with the Algonian intrusives. It is probable that most of the dikes are post-Algonian and pre-Cobalt series in age.

"The dikes ordinarily are of normal type, medium-grained, showing chiefly plagioclase feldspar and augite with some interstitial quartz.

"Occasionally porphyritic varieties that contain

large phenocrysts of greenish feldspar up to two and three inches in diameter are observed. One of these occurs on the north line of Alma, 20 chains west of the second mile post. It contains greenish porphyritic feldspar in a coarse matrix of labradorite and augite with magnetite.

"There are several dikes of porphyritic diabases intruding Keewatin rocks along the trail north of Davidson creek.

"On the east shore of the southwest bay of Squaw lake in the Indian reserve there is a hornblende diabase. Small rods of plagioclase are set in crystals of hornblende and hypersthene. Interstitial quartz is abundant, and magnetite occurs in small grains." \*

Similar observations have been made by Dr. H. C. Cooke on the occurrence of diabase dikes in the Matachewan Area. \*\*

Of the same series of rocks in the Gowganda area Mr. Burrows says:

## "Pre-Cobalt Series Dikes"

"There are numerous dikes of diabase that are at least older than the Cobalt series. They occur in profusion throughout the Keewatin area northeast of Gowganda townsite, east of Millar lake and elsewhere. These dikes have an approximate north and south strike. They are fresh-looking rocks, and except by their association are difficult to distinguish from similar-appearing dikes that occur in the Cobalt series and that occasionally intrude the Nipissing diabase. They generally contain some quartz grains, but on the whole are darker-looking than the quartz diabase of the sill. They show a somewhat rusty surface, whereas the sill diabase usually has a lighter-coloured oxidized appearance. Porphyritic texture is not uncommon in the dikes, with phenocrysts of feldspar varying from an inch to three inches in length. Such porphyritic texture is not recognized in the diabase sill, and this criterion will serve to distinguish the dikes from the sill where only scattered exposures occur through the drift and relationships cannot be seen. The dikes occurring rarely in the Cobalt series and those that cut the diabase sill strike more nearly east and west than north and south. A number of north and south dikes intruding the syenite-porphyry, which is considered of Algonian age, were observed in the Matachewan area. No acid intrusive rocks that seem to be of Algonian age occur with similar dikes at Gowganda, but the north and south trend and nearness of localities together with the similarity of appearance suggest that the Gowganda dikes are probably also of post-Algonian age. This would place these dikes between the Algonian and Cobalt series in age, and younger than the basic intrusives called Haileyburian in the vicinity of Cobalt.

\*The Matachewan Gold Area, Ont. Dept. of Mines, Vol. XXVII, Part I, pp. 229-30, 1918.

\*\*Geology of Matachewan District, Geol. Surv. Can., Memoir 115, p. 33, 1919.



"The dikes have no special characteristics, being of ordinary diabase consisting essentially of plagioclase and pyroxene, with or without interstitial quartz. No olivine was observed in sections examined. Two porphyritic dikes are very striking in appearance, one on the transmission line, claim H. F. 209, and the other crossing the main road, on claim T. C. 458, west of Leroy lake. The former of these is older than an adjacent diabase dike with similar north-south strike.

"The dikes are not of economic importance as a source of silver since they are much older than the diabase sill. Considerable prospecting was done on them before their age relations were known. Unless in proximity to the sill the possibility of silver-bearing veins being found in them is remote. One of the most interesting localities where the dikes occur is on claims W. D. 961 and W. D. 964. Here they intrude a quartz-porphry, or felsite, and iron formation, but are overlain unconformably by conglomerate of the Cobalt series. All these formations are intruded by a younger quartz-diabase dike that strikes a few degrees north of east". \*\*\*

#### More Northern Occurrences

Within the last two or three years Mr. D. G. H. Wright has mapped, geologically, an area that lies over forty miles northward of Gowganda and has found there the same series of dikes described by Mr. Burrows in the Matachewan and Gowganda areas. Mr. Wright's report is now in the press. It is entitled "Geology of the Watabeag Area" and will form part VII of Vol. XXXI of the Ontario Department of Mines' publications. Of the dikes Mr. Wright says, in the marginal notes on his map:

#### "Post-Algoman and Pre-Cobalt Series"

"Dikes and sills of diabase belonging to this age are to be found with a widespread distribution throughout northeastern Ontario. The dikes definitely of pre-Cobalt series age are frequently characterized by phenocrysts of labradorite feldspar sometimes one or two inches in diameter. The phenocrysts have a greenish-yellow waxy appearance, due principally to sericitization and kaolinization. Other diabases which petrographically are practically identical with the Nipissing diabase are also found. The dikes usually strike in a northerly direction."

Owing to the wide distribution of this igneous series and the importance of distinguishing it from the Nipissing and other diabases, etc., it would appear advisable to give it a distinctive name so as to avoid using the phrase "pre-Cobalt and post-Algoman" when referring to it. Mr. Burrows proposes to call this group of rocks the Matachewan series.

The Eozoic or pre-Cambrian rocks in northeastern Ontario, as regards age relations, may be classified as shown in the following table, the names of the igneous groups being placed in parentheses.

#### EOZOIC OR PRE-CAMBRIAN

|       |   |                                            |
|-------|---|--------------------------------------------|
| Upper | { | Keweenawan — Nipissing diabase,            |
|       |   | etc., of N.E. Ontario                      |
|       |   | Animikean—sediments of Cobalt series, etc. |

|        |   |                                            |
|--------|---|--------------------------------------------|
| Middle | { | Great Unconformity                         |
|        |   | (Matachewan)—diabase dikes etc.            |
|        |   | (Algoman)—granite, porphyry, etc.          |
| Lower  | { | (Haileyburian) — lamprophyre, diabase etc. |
|        |   | Timiskamian - sediments                    |
|        |   | Great Unconformity                         |
|        | { | (Laurentian)—granite, etc.                 |
|        |   | Grenville—limestones, etc.                 |
|        |   | (Keewatin)—basic lavas, etc.               |

It will be noted that the three subdivisions, Lower, Middle and Upper, are based on two great periods of erosion, viz., those in which the Timiskaming and Animikie sediments, respectively, were deposited. The sediments of Grenville age, consisting of greywacké, quartzite, iron-formation, limestone and other fine-grained materials, are believed to be in part, at least, contemporaneous with the submarine lava flows that represent the Keewatin. No undoubted evidence of land or surface erosion has been detected, the sediments representing chemical deposits and fragmental material that may have been produced during the eruption of the lavas, certain fine-grained fragments being changed to clay, etc., through decomposition in the sea water. One of the chief characteristics of the Grenville sediments is their fineness in grain.

There is an unconformity between the Animikean and Keweenawan sediments in the Lake Superior country, but it is of minor importance compared with that at the base of the Animikean or the Timiskamian. There are minor unconformities within the Animikean. In northeastern Ontario Keweenawan sediments have not been recognized. The Nipissing diabase is considered to represent the Keweenawan lavas. The age of the olivine diabase and other dikes younger than the Nipissing cannot be definitely determined in the northeastern region.

Toronto, March, 1923

W. G. M.

#### NEW SAFETY REPORT

Safe Practices Pamphlet No. 54 entitled "Handling Material" has just been published by the National Safety Council, 168 North Michigan Ave. Chicago. Handling material is generally recognized as one of the greatest safety problems in industry and according to state reports handling material by hand causes more accidents than all machinery. The pamphlet is divided into the following main divisions: Power Trucks, Hand Trucks, Piling Material, Handling by Hand and Safe Habits of Work, each of which is again subdivided into paragraphs dealing with the different types of equipment used and the different methods employed in handling various types of material. The pamphlet is freely illustrated with photographs and diagrams. A large number of industries are covered and owing to the fact that handling material is common to every industry, the pamphlet has an unusually wide range of usefulness. The experience of many members of the National Safety Council was contributed in the preparation of the pamphlet and the assistance of a committee of seventy-five Safety Engineers was employed in editing and revising the material.

The Canadian Pacific Railway is watching closely the development of the new gold area of northwestern Quebec, in case the extension northward of its Temiskaming branch should be warranted.



# THE MINING SOCIETY OF NOVA SCOTIA

ANNUAL MEETING IN HALIFAX,  
APRIL 9th TO 12th

The 31st Annual Meeting of the Mining Society of Nova Scotia was held in the Board of Trade Rooms, Halifax, from the 9th to the 12th of April, inclusive. About fifty members were in attendance, most of them from the mining districts of the Province. Visiting members from other parts of Canada were, Dr. W. H. Collins, Director of the Geological Survey and Mr. J. A. Dresser, Montreal, President of the Canadian Institute of Mining and Metallurgy.

The following officers were elected for the coming year—

President, C. M. O'Dell, Sydney, Chief Resident Engineer of the British Empire Steel Corporation.

1st Vice-President, Alex. S. MacNeil, Glace Bay, Superintendent Dominion Coal Company.

2nd Vice-President, F. W. Gray, Sydney, Asst. to Vice-President of the British Empire Steel Corporation.

Secretary-Treasurer, E. C. Hanrahan.

Councillors: T. J. Brown, Deputy Minister of Mines, Halifax; R. E. Chambers, New Glasgow; W. H. Graham, Sydney; Walter Herd, Sydney; D. H. MacDougall, Sydney; Col. Thos. Cantley, New Glasgow; K. H. Marsh, Sydney; H. J. MacCann, Sydney; Hon. Robt. Drummond, Stellarton; Malcolm Blue, Stellarton; Alex. MacEachran, Glace Bay; D. H. McLean, Glace Bay; D. J. MacDougall, Stellarton; H. B. Gillis, Sydney; Wm. Bischoff, Sydney; J. C. Nicholson, Springhill; Geo. D. MacDougall, (ex officio, as Past President.)

Following is the address of Mr. Geo. D. MacDougall, President. With a faculty of terse and concise expression, and the knowledge that enables him to make sound, practical comment on every subject discussed, and withal a big heart overflowing with desire to help all men showing any inclination to help themselves. Mr. MacDougall was, and is, a great inspiration to the Society whose work he has guided with skilful hand.

## Presidential Address

"Gentlemen of the Mining Society of Nova Scotia:—  
"I appreciate very much the privilege (which is, I think, unique in the history of our Society) of preparing three annual addresses, this being the third.

Last year in my address I opened up the question of lack of attention given to Nova Scotia by the Geological Survey of Canada, and I was authorized by the Annual Meeting to take such steps as might seem necessary to the end that this situation might be corrected. Dr. Collins, Director of the Geological Survey, was good enough to come to Sydney to discuss the question involved, with me and with other members of the Society. A competent committee was appointed and this committee will report at this meeting and I am sure you will be satisfied with the undertakings of the "Survey" and will approve the comprehensive suggestions made for future activities.

"Perhaps no question, not even excepting the railway question, is of greater importance to the people of

Canada today than the fuel question. I might more properly say the coal question, for after all coal is our only important fuel. We, of course, recognize the tremendous importance of our water powers as a source of energy, but as a source of heat for commercial purposes they do not affect the main question. The annual meeting of the Canadian Institute of Mining and Metallurgy devoted a whole day of their recent annual meeting to this question. The Parliament of Canada is investigating it through a special committee of the Senate. The press of the whole country has been filled with articles relating to this same subject. These facts I mention only to indicate the importance that has been and should be attached to this problem. One might say well: 'Nova Scotia is all right; let the rest of Canada look out for itself, as best it may. What do we care?' That is not a correct attitude. We care very much and for more than one reason.

(a) We are interested because we are an integral part of the Dominion and Canada's problems are our problems.

(b) We are interested because there is a very considerable inter-relation between our railway problem and our coal problem.

(c) We are interested because the success of Nova Scotia depends in a very considerable measure on the mining of coal and that part of Canada contiguous to the St. Lawrence River is our principal and natural, as well as our present market. There may be other good reasons, but this last is the one most interesting to us at this time.

## The Fuel Problem

"What is Canada's Fuel Problem? Briefly stated it is this. From the Pacific Coast to slightly east of Winnipeg, coal can be procured from British Columbia and Alberta. From Montreal, or slightly west, to the Atlantic Ocean coal can be procured from Nova Scotia. This leaves a gap representing approximately the Province of Ontario, or at least that portion comprised between the eastern and western extremities of the Great Lakes, which has no coal fields and has been heretofore supplied with coal from the United States. The total coal requirement of this district is roughly 10 to 12 million tons a year, of which about 25 per cent is anthracite; the amounts for the Province of Quebec will be about half these. Inasmuch as the total output of all Canadian collieries, as shown by the Dominion Bureau of Statistics for 1922, was slightly over 15,000,000 tons with imports above exports of 16,000,000 tons, there can be no talk of relief from within, on our present basis of consumption, production and methods of use.

"Inasmuch as the United States' future supply of bituminous coal for export is better assured than their supply of anthracite coal for export, we should most properly consider the replacement of the anthracite requirements.

## Coke in Montreal

"It is well established that coke made in the modern by-product oven is an equivalent of anthracite coal. The particularly good feature of the manufacture of coke is not only its use of the slack, which is high in friable coals, but the recovery of the by-products such as gas, tar, sulphate of ammonia, benzol and such further derivatives as exigencies of business may justify.

"We are glad to note that following a recent meeting of shareholders of the British Empire Steel Corporation an announcement was made to the effect that the matter of establishing a coking plant at Montreal was being investigated.

"It is not my intent, nor do I believe our Society at the moment wishes, to suggest a solution of this question, but we are quite willing to assist all legitimate efforts to discover the solution. We are glad to note the efforts of the Government of Canada and of Parliament.

“Much has been written for our scientific societies setting forth Canada’s position in regard to our coal reserves and output, and Mr. F. W. Gray in a clear-cut article points out that 10,000,000 tons per annum should be considered a maximum Nova Scotia output. Our present yearly outputs are under 6,000,000 tons.

"Speaking broadly, if Canada is to be independent in the matter of coal supply, her production must be more than doubled. This is a serious problem, involving the unfortunate 'freight rate' question, and must be well considered before being advanced with any degree of seriousness. It would seem as if Canada must be dependent for some considerable time at any rate upon imports of fuel for the comfort and prosperity of its citizens.

## Gold

"We are glad to note by the Mines report for last year some small, but nevertheless hopeful, signs of activity in our gold fields. A report by Mr. Beveridge suggests that 'gold bearing leads' are not of a shallow nature as was indicated by Mr. Rickard some years ago. It is to be hoped that close study of these fields by competent men will bring this industry back to its position of the year 1900.

"It might perhaps not be too much to suggest that the establishment of an assay office, possibly in connection with the Nova Scotia Technical College, where prospectors could, free of charge to them, have samples assayed, would be a considerable stimulus.

"It was a matter of great satisfaction to the members of this Society when the then Government of Nova Scotia selected Mr. T. J. Brown, one of our Past Presidents and most active members, as Deputy Commissioner of Mines. This satisfaction was increased when Hon. E. H. Armstrong, who for years held the important portfolio of Minister of Mines, succeeded to the Premiership. As your President I was pleased to extend my felicitations and assure both gentlemen of the active support of the Mining Society.

"I desire to tender my thanks to the whole membership not only for the confidence expressed in electing me President of your Society, but for the generous assistance rendered me at all times in directing your business. I believe the mining industry in Nova Scotia is on the eve of better days and it now remains for us to exert our best efforts of skill and education to the end that the prosperity our Province deserves may

become (insofar as we can make it possible) an actuality."



Mr. Mayall is sure of one thing, and that is that successful flushing can be done, provided the necessary materials can be obtained cheaply and in sufficient quantity to fill up the sections from which coal has been extracted, and sufficient additional quantity of coal won from these sections to cover the extra cost of operations. Professor Sexton pointed to the possibilities of compressed air instead of water as a vehicle, which when liberated could be used for ventilation and save the cost of having to pump the water back out of the mine.

### "The Evolution of the Wash House"

This paper by W. H. Graham, Superintendent of construction, was interesting from the fact that the finest wash houses, perhaps, at any Canadian collieries are to be found in the Glace Bay District, built by Mr. Graham. As with many another expert, the latest building, which is by far the best, shut out Mr. Graham's view in retrospect, and he failed to look back to the beginnings. A better builder than he is a painter, his picture did not fully describe what he had really accomplished. There was no comparison with the wash houses of early days, many of which he either modernized or pulled down. He did, however, emphasize the advantage of the hollow wall in the construction of large buildings. He pointed out its durability, its cheapness and its comforts, and possibly, after all, these more than any other features, interest the average operator of large concerns. But when to the returned soldier, who, under military orders had acquired the habit of bathing, he gave the credit of bringing the use of the wash houses up to 100 per cent, he forgot his own labors in making the building so attractive, so clean and comfortable, so well ventilated and heated, and so well fitted up with cold and hot shower baths, that workmen could not refrain from their use, even if they would. The miners of these collieries, with their modern bath houses, have come to look upon them as part of their daily life, and could not now go on without them.

### Discussion of Mr. Gray's Notable Paper

That part of Mr. F. W. Gray's paper of last November relating to Nova Scotia was read and discussed. Most favorable comment was made on its scope and nature, and all present felt that Mr. Gray pointed the way out of one phase of the difficulty surrounding Canada's fuel problem. Some believe that through the by-product process an equivalent to anthracite has been found. Good coke, it was stated, is better than anthracite; eight tons of it giving as much heat or power as ten tons of hard coal. There is little residue left in the way of ash. The other features, such as the converting of coal into gas, or extracting all its volatile constituents in the way of oils, etc., were commented on. Mr. MacEachran, Chief Inspector of the Dominion collieries, touched on the increased power developed when coal is converted into gas, and used direct as a motive power. He also referred to the surprising results from the use of lignite thus treated.

### "Rescue Breathing Apparatus"

This most interesting paper, from Mr. J. C. Mackie, chemist for the British Empire Steel Corporation, stressed the necessity of having the lungs of the operator of any type of self-contained breathing apparatus thoroughly washed out by the use of pure oxygen before beginning to put it on. If this were not done, serious results might follow, especially if the oxygen

supply failed. It was pointed out that many cases of carbon dioxide poisoning were actually due to some other cause, and now generally believed to be a mixture of oxygen with nitrogen and other gases. The discussion on this paper brought out some valuable information on the successful treatment of men overcome by gas in a coal mine or any similar place, when carbon dioxide mixed with oxygen is used for resuscitating, rather than pure oxygen. One member stated that many cases of gas poisoning when treated with oxygen die from pneumonia a short time afterwards. The principle of washing out the lungs with pure oxygen is one followed out at all well equipped rescue stations.

### Dr. Collins' Address

The Committee on Geological Survey at the first session asked to have their report lie over until Dr. W. H. Collins arrived in the city. This was agreed to, and Mr. F. W. Gray submitted the report the following morning. After it was read, Dr. Collins, in his own quiet, undemonstrative manner, addressed the members. Even though competing against the noise of many of the vehicles of Halifax rushing and rumbling over a granite block pavement, Dr. Collins succeeded in carrying his hearers with him into the wilds, where pioneer work was being done, so that the prospector, and after him the operator, might with some degree of certainty follow and dig the stored-up treasures of ages. He reviewed the work that had been done in the way of survey and map making; he told of the difficulty encountered, of the progress made and of the present intentions of the Geological Survey. It was fully recognized that in the light of the research work done in Nova Scotia during the past year, the Geological maps required to be brought up to date. This matter was now being attended to; but to be permanently completed, some further work was necessary. He further dealt with the wisdom of concentrating on certain sections of the province, such as those known to contain oil shales, gypsum and other such minerals. The saline areas, with their old sea deposits would receive early attention, and the gold areas would come in for further investigation. Dr. Collins had to answer many questions, and he succeeded fairly well in satisfying the members of the Society. A committee was appointed to meet with Dr. Collins, who stated he had the duty of looking after the Geological Survey work of Nova Scotia, and would be pleased to have the advice of all who could help him. Dr. Pierce followed and in a vivid and forceful speech pointed to the necessity of free circulation and quick issue of the geological maps of Nova Scotia.

### Mr. Dresser's Address

Mr. John E. Dresser of Montreal, President of the Canadian Institute of Mining and Metallurgy, addressed the members on the advantages of belonging to an organized body, such as they were. The need of unity from east to west of Canada and the necessity for team work and concentrated action at critical moments in the life of the industries represented, was strongly emphasized by this stalwart, rugged-looking Canadian. His appeal was to the best and highest in the men he addressed.

If the writer is not mistaken Mr. Dresser is a big man in every way. He was ably backed by Professor Sexton of the Technical College, Halifax. What Nova Scotia workmen owe to this fresh-faced, cheery, hard-



working educationist, we will not here try to say, but the debt is great, and the fact that the professor was an active member, taking part in the discussions on the several papers, added much to the instruction and information of the members.

Hon. Robert Drummond with his eighty-three years, vigorous in mind, keen in debate, progressive and optimistic as the youngest member present, was heard with pleasure and delight, and when it came to a battle of wit or wisdom, he easily held first place.

Mr. V. A. Paton, Chairman of the Compensation Board, was present, and addressed the meeting. A man of ability, he has convictions, with the courage necessary to put them into execution. He is in the right place, and with his large experience, is in a position to help apply a remedy to the evils creeping into the Compensation Department at the places where accidents occur. I would not venture to say there are any of these evils in his office at Halifax.

#### Accident Prevention in Coal Mines

This was a well-written, scholarly and practical paper, by J. R. Dinn. Mr. Dinn is manager of No. 4 Colliery, Dominion Coal Company, and holds the record for low accident rate. During one whole year there was not one fatality in his mine, which is a very large one. He emphasized the necessity of co-operation between the mine officials and the mine workers. Close personal contact, educational propaganda, thorough training and instruction were all necessary. The higher percentage of accidents occurring on the haulage ways, and those caused by falls of roof rock and stone, were pointed out. Many other suggestions were offered. The fact that there was very keen discussion on this paper, a large number of the members taking part, showed the interest it aroused. Mr. Dinn was thanked for his able and very practical presentation of a very difficult problem.

#### The Mining Society and the Institute

A discussion arose over the relationship between the Mining Society of Nova Scotia and the Canadian Institute of Mining and Metallurgy. It was pointed out that the financial arrangement between these bodies was not in the interest of the Nova Scotia society, and tended towards a small membership. There was no incentive to increase the number of members, seeing that all additional monies coming from those who joined, after the hundred mark had been reached, went to the Institute. Mr. Dresser and Dr. Collins both assured the members of the Society that there was no intention on the part of the Institute to do other than help the Society in every way. There could be no progress made if any part of the body lagged behind, and Nova Scotia Mining Society was an integral part of the Institute. A committee was appointed, representing the Society and the Institute, for the purpose of formulating a policy. It was generally felt that an agreement suitable to both societies would be reached. The members are to vote on the proposal submitted by the committee.

#### The Banquet

One of the enjoyable events of the Mining Society meetings is the Annual Banquet. It was held in the Halifax Hotel and all present were unanimous that this year's Banquet excelled all former ones.

The retiring President, Mr. Geo. D. MacDougall, and Prof. Sexton gave short, practical addresses, asking the sympathy of the more experienced and prac-

tical members for the new-fledged engineers from the Technical College. Mr. C. M. O'Dell, president for the present year, and Deputy Minister T. J. Brown, both master story tellers, were at their best, and added much to the merriment of the evening. It was one of the "ne'er to be forgotten" nights, when, after a hard day's work, kindred spirits met in jovial mood." J.M.

#### NOVA SCOTIA MINES REPORT

The report on the mines of Nova Scotia for 1922 is, as usual, a tidy little volume of over 100 pages. It records operations that, on the whole, are only fairly satisfactory. The expected recovery in the coal and iron trades was badly hampered by disturbances among the workmen, due to dissatisfaction that appears to have become chronic. Gypsum production was increased from 185,934 tons in 1921 to 256,876 tons in 1922. Gold ore to the amount of 4,837 tons was milled—three times the amount of the previous year. The gradual development of the salt mine at Malagash is reflected in the increase of output from 2,606 tons in 1921 to 5,250 tons in 1922.

The provincial income of Nova Scotia is derived to a notable extent from mining. The revenue of the Mines Department during 1922 was \$548,318, the bulk of this (\$490,318) being from coal royalties. No statement of expenses of the Mines Department is given in this report; but it is only a small fraction of this amount. The mining industry is very profitable, directly as well as indirectly, to the government of Nova Scotia. It might well afford to re-invest a larger fraction of this income in services that would tend to develop still further the mineral resources of the province.

The Deputy Inspectors of Mines report briefly each on the coal mines under his supervision. The salient points about each colliery are noted, and progress during the year. A notable feature is the large amount of development and equipment of a permanent sort that has been installed in the collieries of the British Empire Steel Corporation during the year. The gradual equipping of all the principal collieries with modern wash-houses and first-aid stations is likewise recorded in these reports.

In the section devoted to metalliferous mines and quarries, most attention is paid to gold, though there was won during the year only \$16,445, from 4,837 tons of ore (uniformly called "rock" throughout the report). This gives an average recovery of only \$3.41 per ton. At the Sherbrooke Mines, 3,760 tons yielded an average of \$1.80 a ton. At the Montague Mine, 53 tons of ore yielded 106 ounces, or \$40 a ton. At the latter mine a new jigging process (wrongly called "flotation" here) is being installed, which gives some promise of success. The inspector, Mr. Thomas Beveridge, recommends that more attention be paid to large low-grade deposits of gold ore, which have not yet received the attention warranted.

Of the non-metallic minerals available in Nova Scotia, only gypsum is being mined on any considerable scale, and all of it is being exported in the raw state. The mining of rock salt is under capable and energetic management, and will probably be developed to much larger dimensions as a market is won. The report suggests that the non-metallic minerals of the province present a favourable field for private enterprise.

The report does not mention any work on oil shale during the year. Beds of shale of great potential im-



under way to make use of them might well have been recorded. There is likewise no mention of the metal-  
 output of the company.

This report in common with those of previous years, might be a good investment for the Mines Department of Nova Scotia to see that in the future reports this requisite facility for creditable appearance, as well as

### ANNUAL REPORT OF "CONSOLIDATED"

The report of the Consolidated Mining and Smelting Company of Canada, Limited, presented at the annual meeting this week, shows 1922 to have been a very satisfactory year from the operating point of view, and at least a promising year from the financial view point. Mr. James J. Warren, president of the company points out that after all current expenses and capital charges were met, there was available for addition to the reserve funds the sum of \$1,228,329. This was accomplished in spite of the very heavy capital expense involved in the building of the Sullivan mill and in the development of the Rossland mines, both of which expenditures are as yet unremunerative, as well as over \$350,000 spent on additions and alterations to the plants at Trail, most of which was used to extend the lead smelter and refinery. Mr. Warren draws attention to the burden of taxation, as "well nigh intolerable," and remarks that "fuel prices remain extortionate." He also confirms officially the arrangement whereby Consolidated will smelt Copper Mountain ore for Granby and will market the product.

Mr. Blaylock's report as general manager describes principally the smelting and refining plants. He notes that wages are still 33 1/3 per cent above the pre-war scale, supplies about 50 per cent higher and coal and coke, 100 per cent higher. In regard to the last, he notes that the coal miners are working only about half their time. The other side of the story was alluded to briefly by Mr. W. R. Wilson of Fernie at the meetings of the Canadian Institute of Mining and Metallurgy in Montreal in March when he mentioned the irregularity, and often the urgency, of orders for coke from Trail. Apparently the two managements require to "get together." Mr. Blaylock alludes briefly to the development and operation of the various plants at Trail and at the mines, which have been described from time to time in these columns. He records the highly satisfactory fact that "the metal output, which has had a steady growth during the year, has greatly exceeded that of any previous year." A highly important fact is that "the Workmen's Co-operative Committees have been in existence for three years, and have provided an ideal method of communication between the men and the management." The technical staff, as well as the workmen, of Consolidated are notable for their loyalty to the company they serve.

Mr. W. M. Archibald, manager of mines, reports a satisfactory year, both in development and in production, at the company's mines. At the Rossland mines new and important ore deposits have been discovered and developed, and are ready to supply the concentrator and smelter when they become available for use. Little was done to explore or develop the company's smaller properties, and no new properties were acquired. Little development work was done at the Sul-

livan, as the vast amount of ore already determined there is ample even for the new 1500-ton concentrator, which, by the way, is now expected to handle 2000 tons of ore a day.

Messrs. T. W. Bingay, comptroller, and W. S. Rugh, sales manager, in their brief reports, record a successful year and look forward to a better year to come. Mr. Lorne A. Campbell's report on the West Kootenay Power and Light Company concludes a very satisfactory annual statement.

### INCREASED PRODUCTION OF MAGNESITE IN UNITED STATES IN 1922,

The production of crude magnesite in the United States in 1922 was 32 per cent greater than that in 1921. It amounted to 63,487 short tons, valued at \$650,742, according to figures compiled by James M. Hill, of the United States Geological Survey. Practically all the magnesite mined in 1922 was obtained from deposits in California, though a little was mined in Washington during the latter part of the year, and some calcined magnesite was shipped from stock piles at Valley, Wash.

Figures showing the imports of magnesite since the tariff act of 1922 went into effect (September 22, 1922) have not yet been published. The imports during the part of the year prior to that date amounted to 112,159 tons, valued at \$1,757,636, as compared with 42,486 tons valued at \$592,491, in the whole of 1921.

No crude or calcined magnesite was exported in 1922. The exports of magnesite pipe and boiler coverings and other manufactures during the year amounted to 3,831, 681 pounds, valued at \$223,686.

More than 90 per cent of the domestic magnesite produced in 1922 was sold in the calcined form and brought from \$30 to \$50 a ton. A small quantity sold crude for chemical uses was priced at \$10.50 to \$12.50 a ton. The prices quoted on domestic magnesite were about \$10 a ton throughout the year.

The assurance of good prices upon the passage of the new tariff act greatly stimulated the domestic industry. Many deposits in California are being reopened, and additional equipment is being installed at calcining plants.

There is also renewed activity in the Stevens County field, Wash. All magnesite operators are optimistic as to the future of the industry.

### INDUSTRIAL ITEMS

A Gondola Car Unloader of simple and substantial design has been put on the market lately by the Link-Belt Company of Chicago. It is in the form of a revolving tippie which rotates the car after clamps have descended on its upper surface to hold it securely on the tracks, and along one side to support its weight. It can handle forty cars an hour and requires but 35 to 45 H.P. to operate. Any gondola car of standard design can be unloaded in the new mechanism. The movement of a lever controls the whole operation.

A change in personnel is announced by the Mine and Smelter Supply Co., of Denver, Colorado. Mr. Malcolm H. Carpenter has been placed in charge of the company's El Paso branch, and is succeeded in the Pacific Coast office in San Francisco by Mr. E. Shores.

# The Mining Districts

BY THE JOURNAL'S CORRESPONDENTS

## QUEBEC

**Surveys**—The staking of claims in the townships of Dufay, Montbeillard, Dasserat, Rouyn, Joannès Dufresnoy and Duprat in the counties of Abitibi and Temiscamingue has developed to such importance as to warrant surveys of all old as well as of new township lines, and of all lakes, rivers and creeks within these townships.

When notified of the necessity of more complete survey maps in the region of this new goldfield, the Survey Branch of the Department of Lands and Forests, Quebec, gave instructions for the re-survey of the base lines established by G. C. Rainboth in 1897 and by H. O'Sullivan in 1907 and of other divisional lines. With old lines well cut, the underbrush cleared, new mile posts regularly placed, and new township lines completed, the limits of any one township can not be missed.

As a claim located in the center of a township is as much as five miles from the boundary lines, a new system of tying claims to surveyed points has been inaugurated. From now on, in the townships recently surveyed, instead of having to tie a claim to a mile-post on a township line, it will only be necessary for the prospector to tie his claim to one of the numerous stations placed on all lakes and streams in the region.

In surveying the lakes, rivers and creeks within these townships, the surveyors have established well defined stations, to be shown on the survey map. In the field these stations are indicated by square or oval brass plates measuring 4 by 2½ inches, bearing the following inscription, "Dep't des Terres et Forêts-Québec-Servise des Arpentages", underneath the number of the station. In Rouyn township, where this system was inaugurated by its inventor, surveyor Jules Castonguay, the plates bear his name.

These plates are nailed on trees at frequent intervals on blazes from twelve to eighteen inches long. As many as two hundred stations have been established in Rouyn township.

The survey of Rouyn township by Mr. Castonguay and of Dasserat and Boischatel by Messrs. Jones and Malouin, which were started in January, are now completed; that of the township of Dufresnoy by Mr. P. Dutil and of Dufray and Montbeillard by Mr. A. Massé are begun but will be finished only after the break-up.

In Gaspé county, where an occurrence of copper ore has been located, the survey of three of the most important rivers, the Dartmouth, the York and the St. John, has been made and similar stations have been posted.

## NORTHERN ONTARIO

**Kirkland Lake Branch Railway.**—Chairman Geo. W. Lee, of the T. & N. O. Ry. Commission, has stated that it has been decided to proceed immediately with the construction of the Kirkland Lake branch. This branch will start at Swastika, pass through the Kirkland Lake

camp, eastward through the Crown Reserve property, with a terminus on Larder Lake. Tenders will be called for within the next two weeks, and construction work will be started without delay. Mr. Lee estimates that ten miles will be completed by next September, and that the entire line will be in operation by the first of next year. This line will serve a large and growing mining district, in which \$15,000,000 has already been expended by the various mines. In the Kirkland section there are four producing properties, with the Tough-Oakes also ready to produce. The Ar... with the very satisfactory developments at the Crown Reserve... start on one, at least, and possibly two new mills within a short time. This is the first time the T. & N. O. has built any lines to serve a mining district for twelve years, and a great deal of credit is due to the "North... construction.

**Miners' Union.**—The Forequre Miners' Union which has been dormant for several years, has suddenly come to life and presented a demand upon the managers for an increase of twenty cents an hour. For a long time the Union has had practically no organization and very few members, but according to the claims of the officials, hundreds of men are signing up, and they expect to have the camp well organized. It is understood, however, that some of the more conservative members among the miners in... which would have a big influence in retarding development in the district. If this better counsel prevails, it is probable that the operators will endeavor to meet the men. At the present time some of the mines are not deriving enough revenue from operations even to meet the payroll, but it is probable that there is likely to be a labor shortage during the summer months. Under normal conditions... claim of any increased cost of living to justify their demands, but frankly admit that they are taking advantage of the opportunity created by a shortage of men. So far nothing has been heard of a similar movement in the district.

**Cobalt.**—The annual report of the Nipissing Mine... at \$2,532,354, as compared with \$1,869,566 in the preceding year... standing the large production, the known ore reserves



decreased only 389,000 ounces and now stand at 2,615,000 ounces. A number of outside properties were examined and considerable work was done on some of them but none of the options were exercised. Dividends amounting to \$1,120,000 were paid during the year and the surplus profits as of December 31st were \$4,210,051. The report states that the mine can be relied upon for a good production during the coming year. During the month of March the company mined ore of an estimated net value of \$189,784, and shipped bullion of an estimated net value of \$173,481. There was also a production of 33,500 pounds of cobalt. The low-grade mill treated 7,193 tons and the high-grade plant 100 tons. The refinery shipped 253,783 fine ounces of bullion.

At the annual meeting of the McKinley-Darragh, the old board of directors were re-elected. It was decided that no dividend should be paid at present and the President and Manager were empowered to take what action they considered advisable regarding the acquisition of another property.

The Colonial shaft has cut the diabase-Keewatin contact at a depth of 962 feet, and crosscutting operations have already been started. It is not known just how far the crosscut will have to be extended in order to intercept the vein that is being looked for. On the Violet property of La Rose, adjoining the Colonial the shaft is down 540 feet, and it is expected that it will be completed in about five weeks. Production from this property should be resumed before the first of June.

**Porcupine**—The decreased production from the gold mines of Northern Ontario for the month of March reflects the power shortage that is being experienced in Porcupine. The value of the production was \$1,300,000 as compared with a recent record of \$2,000,000. This decline of \$700,000 in production shows how serious the power situation really is, because this loss is entirely from the Porcupine mines, the Kirkland Lake camp not being affected. It was expected that additional power would be available about the middle of April, but recently some of the worst storms in the history of this country have been experienced, which will delay the break-up. The Dome, with a considerable steam equipment, is able to treat only about 300 tons a day, while the McIntyre is down to about 100 tons.

Official advice from the Vipond state that the most encouraging discovery of recent months has been made in the 400-foot level. The vein is said to be 9 feet wide, but values are not reported.

A meeting of the shareholders of the Moneta Mine in Porcupine has been called to ratify a deal for control of the company. The prospective purchasers are English interests, who will put up the necessary money to finance operations, taking treasury stock as money is expended for work. The larger shareholders will also give an option on sufficient of their stock to ensure control.

The Porcupine-Davidson is called for tenders to sink a three-compartment incline shaft to a depth of 1000 feet. The shaft will be at an incline of 72 degrees.

Despite official statements by Hollinger officials, rumors persist that a deal for control of this property is being negotiated with English interests, and it is stated that a company with a capital of £12,000,000 is

being formed in London. Mr. Noah Timmins, President and one of the largest shareholders in the company, is in London at the present time.

At the Scottish Ontario property in Porcupine two diamond drill holes have been completed, and further drilling at greater depth will be undertaken. A third drill is to be started immediately, and it is understood that a total of about 5,000 feet will be drilled.

**Larder**—The Associated Goldfields in Larder Lake has also let a contract to sink the shaft from 500 to 750 feet. Sinking will not interfere with development work on the present levels.

**Kirkland**—The directors of the King Kirkland have negotiated a deal with the Tonopah Mining Company of Nevada for the continued development of the property, for which the Tonopah company will receive an interest. A meeting will shortly be held of the shareholder of the King Kirkland to ratify the negotiations.

## NORTHWESTERN ONTARIO

**Loon Lake Iron Range to be Drilled**—The M. A. Hanna Company, of Cleveland, O., have taken an option to explore the iron lands of the Canadian Iron Company, (generally known as the Rinaldo McConnell lands). These lands are situated at Loon Lake, 27 miles east of Port Arthur, on the Canadian Pacific Railway, and are comprised of one group of iron locations totalling about 4000 acres.

The property was examined in October last, by M. C. Lake, chief geologist of the M. A. Hanna Company, who formed a very favourable impression of the iron range as prospective producer of merchantable grades of hematite ore. The deposit is a bedded hematite from 12 to 20 feet in thickness, with a comparatively light overburden, and is traverse by the Canadian Pacific and Canadian National Railways. It lies at an elevation above Lake Superior of 450 feet and is distant about 4 miles from the head of Thunder Bay, where there is excellent deep water harbourage.

Mr. McConnell and others have done a considerable amount of diamond-drilling in this area, amounting in all to some 50 drill holes, that have disclosed large tonnages of ore, of fairly good grade, much of it being workable by open-cut operations.

Mr. M. C. Lake, geologist, accompanied by E. K. Nixon, of Hibbing, Minn., one of the M. A. Hanna Company's engineers, arrived in Port Arthur on the 12th, and are now on the property with Mr. W. J. Hunter, of the E. J. Longyear Company, of Minneapolis, Minn., who will carry out the drilling operations, with Mr. Nixon in charge for the M. A. Hanna Company's interests.

The drill and crew will arrive on the property April 17th., when drilling operations will be commenced. The drill and operators are being brought from Beardmore, on the Canadian National Railway, where they have been drilling the Leitch lands for the Bethlehem Steel Company.

The Loon Beach Hotel, at Loon, has been opened by the management for the accommodation of officials, engineers, and drilling operators.

The mines and plant of the Demerara Bauxite Company in British Guiana are now manned and it is expected that bauxite will shortly be supplied once more from these deposits.



## ALBERTA

**Alberta Coal for Ontario** — Is the coal of the Province of Alberta suitable in point of quality to meet the requirements of the consumers of the Province of Ontario?

Is it practical economically to ship coal from Alberta to the eastern Canadian market with a view to making Ontario independent of shipments from the United States?

These are the two questions engaging the attention at present of the Fuel Committee of the Canadian Senate, of the governments of the Provinces of Alberta and Ontario, of newspaper men of the two Provinces and of interested business men.

As to whether Alberta coal would be acceptable in Ontario, it was announced recently by Premier Drury in the Legislative Assembly of that Province that the matter of preventing a recurrence of the fuel shortage which has caused much misery in Eastern Canada this year was under consideration. Premier Drury said: "For some weeks this government has been in communication with the government of Alberta regarding coal. We have arranged to get a few cars down to test its fuel value. We are hoping that we can get a freight rate on the National Railways that will make the transportation of large supplies of coal feasible. After studying the situation I have more faith in a solution of the difficult problem by bringing in Alberta coal than I have either in the development of peat or the importation of eastern coal, at least for this year."

Both governmental authorities and newspapers have been actively interesting themselves in the matter. Carloads of Alberta coal have been shipped from different mines to Ontario in order that the tests may completely cover the output of the various fields of the western province. The proprietors of the "Edmonton Journal" has made a number of shipments direct to the proprietors of the "Toronto Star", who will supervise experiments independent of those officially conducted.

Howard Stutchbury, coal commissioner for Alberta, has left Edmonton for the East where he will arrange for a number of fuel demonstrations in Ottawa and Toronto in the endeavor to interest the larger manufacturers in the use of Alberta coal.

The Fuel Committee of the Senate, which is closely co-operating with the Dominion Fuel Board has asked Sir Henry Thornton, president of the Canadian National Railways, to ascertain the lowest possible freight rates that can be quoted on shipments of Alberta coals to the chief centres of Ontario. Incidentally, Dr. D. B. Dowling, who has reported on Western Canadian Coal Fields for the Canadian Geological Survey, is expected to be instructed to investigate and report as to which of the coal-bearing sections of Alberta are most likely to produce coal of a quality suitable for the necessities of the Eastern Canadian market.

**Some Mines of Alberta** — Seven car loads of coal a day, 35 tons to the car, have been coming off what is known as the Coal Branch of the Grand Trunk Pacific Railway this winter. This line in 137 miles west of Edmonton and is 56 miles in length. At Coal Spur there is a sub branch, 31 miles long, on which are situated the Mountain Park, Cadomin, and Luscar Mines which collectively employ between 1,200 and

1,300 men and turn out approximately 100 car-loads of coal a day of high-grade bituminous coal. Generally speaking, along the main branch railway the mines produce an excellent steam grade of semi-bituminous coal. Some of these mines are the Balkin, Stirling, Coal Valley, Foothills, Blackstone, and Mile 54. The Stirling and Coal Valley are "strip" mines, the former producing up to 2,000 tons a day and the latter about 600 tons. The other five aggregate some 1,800 tons a day. These seven mines have been employing roughly 900 men in recent months. At Coal Spur the Yellowhead Mine has been on fire and has not produced during the winter. It is stated that the coal resources of this field are almost unlimited and diamond drill prospecting in the bituminous area near the Cadomin Mine is in progress. The opening up of new mines in this locality is promised.

**New Mineral Tax** — The Government of the Province of Alberta estimates that its proposed new tax on mineral, gas and petroleum leases will yield a revenue of \$300,000 annually. Over fifteen million acres, now held for these rights by corporations and individuals, will be affected. The tax is to be at the rate of 3 cents an acre on mineral holdings.

A large proportion of this impost will have to be paid by the Hudson's Bay Company and the Canadian Pacific Railway Company, which hold over ten million acres of mineral rights. They obtained these lands years ago when the mineral right went with the surface. Homesteaders who obtained patents from the Crown in the early days also will be required to pay this tax for the same reason.

The government has not yet decided definitely that the three cents an acre will apply against all gas and petroleum leases.

**Docks for Alberta Coal** — Floating docks are expected to be placed at Prince Rupert B. C. for the handling of coal shipments from the the Cadomin Mine section of Alberta. It is stated that 2,000 tons a day will be provided from this field to supply the mercantile demands at the northern provincial port.

## BRITISH COLUMBIA

**The Premier Report** — Seldom has the annual report of a mining company created the interest in British Columbia as has attended the issuance recently of the report of H. A. Guess, vice president and managing Director of the Premier Gold Mining Co. Ltd., for the fiscal year ending December 31, 1922.

This is not surprising, for Mr. Guess tells very briefly and yet with transparent clarity the story of one of the most profitable of late mining enterprises on the American continent. Not only that, but the impression is left, notwithstanding the guarded and conservative phrasing, that the Premier Mine has great possibilities outside of those that are determined as a result of work done within the limited area now being developed are exploited.

What has been done in four short years could not be more forcibly set out than does the cold statistical summary of "income and profit and loss account, year 1922." The gross value of ore sold is put at \$4,782,785.43 and against that operating and miscellaneous expenses are placed at \$1,022,506.64, the earnings from mine operations being \$3,760,378.79. The whole tenor



of the... continuance of that faith in...  
 of the... to the...  
 of the... to the...

**Increase of Wages at Trail.** — The Trail Consolidated Mining & Smelting Co., which an amendment of the... subjected to criticism as a... be learned, there is no such... While... in the report that Washington... Trail, notwithstanding the fact that the Fordney tariff imposes a duty of 1 1/2 cents on refined zinc while the Canadian duty is only 1 cent. The point made is that apparently the American shipper finds the Trail rates sufficiently favourable to overcome the higher tariff against Canadian refined zinc. Attention also is drawn to the fact that there has been no change in the lead schedule, although the wage increase has as much bearing on that phase of smelter operations as on zinc.

**Cariboo** — If there is any substance to the persistent reports now circulating, the old Cariboo District of British Columbia is about to enjoy a new lease of life. A statement was made recently that £2,000,000 was being raised in London and a similar amount in Australia for the development of the placer fields of this historic section. Dredging and hydraulicking are the forms the promised activities will take and it is said that, in addition to the Cariboo, the Lillooet, Atlin and Tulameen regions are under investigation with his...

...n Cariboo operator, holds the... of Barkerville under lease... required the land on which the... population is to be moved to a... site south of the present location and higher up on the hillside in order to permit the gold content of the... to be recovered.

Barkerville's buildings are raised in order that the annual overflowing of Williams Creek, caused by spring freshets, will not damage them. The years, however, have brought decay and Mr. Hopp's enterprise has but hastened the inevitable abandonment of the one-time finance...

Gold valued at \$60,000,000, it is estimated, was taken from the... added. This, it is confidently expected, will be materially augmented by... methods.

**Mineral Exhibit for London** — Hon. William Sloan, British Columbia Minister of Mines, has returned from Ottawa, where he arranged for close co-operation between the Canada Society of Exhibitions and the Department of Mines in the preparation of a representative exhibit of provincial minerals at the Empire Exposition to be held at London next year. He also took up at the capital the matter of the coal rights claimed by settlers in the Esquimalt & Nanaimo Railway Belt on Vancouver Island and the Dominion Government pro...

The Kootenay Districts of British Columbia are pre-

paring an exhibit of minerals for display at the annual Northwest Mining Convention to be held at Spokane Wn. from the 22nd to the 26th of May next.

**Portland Canal** — The Daly Alaska, the Forty Nine, the Spider, and the Hercules are properties situated in the Salmon River section of Portland Canal, recently reported to have been bonded and upon which development work will be done this year. British interests are reported to have taken over both the Daly Alaska and the Forty Nine. The former is situated on the Alaska side of the boundary and the latter is well up the river, almost under the edge of the glacier and some three miles northwest of the Big Missouri. Belgian interests have acquired the Spider, on which the Algonquin Syndicate spent \$100,000 in development during the war years. They are reported to have abandoned it because of the discount against foreign exchange.

**Duty on Copper Rods** — The Rt. Hon. Mackenzie King, Canadian Premier, has written F. A. Starkey, secretary of the Associated Boards of Trade of Eastern B. C., that the proposal of replacing the duty on copper rods entering Canada is under consideration. The Associated Boards asked for this action at their recent convention declaring that it was necessary for the protection of the copper industry of the Province.

**Wage Agreement in Slocan** — A new wage schedule has been negotiated between the leading mine operators of the Slocan District, and the International Union Mine, Mill and Smelter Workers. It went into effect on the 1st. of April last and the wage for miners for an eight hour a day is fixed at \$5. The chief operators concerned are Clarence Cunningham, of Alamo, and the Rosebery-Surprise and Rambler-Cariboo companies. In 1920 the Silversmith, Sandon, parted company with the other mines and entered into an understanding with the One Big Union. The company is said to have decided upon a similar scale with the O.B.U.

**New Crushers for Rossland** — The installation of crushers to prepare the ore of the Rossland Mines before it is shipped to the Trail Smelter has been decided upon by the Consolidated Mining & Smelting Co. It is hoped that this additional plant will be ready for use by the time the Kimberley concentrator is completed.

**Resolution on Tax** — Silverton is the source of a resolution calling upon the provincial government to tax idle mineral claims and abandoned mine plants. Such holdings, it is stated, are held, in many cases, for speculation and should be made to pay just as is an inactive sawmill or a miner's house. The Ministers of Finance and Mines are told to wake up and "find some more reasonable and sensible method of taxing mining property."

**Ainsworth.** — The Lake Shore Mine, Ainsworth, is reported by E. J. Edwards, manager, to be looking well and it has been recommended that the property be provided with a mill of 150 tons capacity.

The Yellowstone Mine, Sheep Creek, again is in condition for operation. The concentrator has been remodelled, five new tables having been installed. Twenty men are at work in the mine driving a raise through a body of ore said to assay over \$30 a ton and the mill is working daily.

The first carload of ore to be shipped from the Emerald Mine for over three years has just gone forward to Trail. This is the property of the Iron Moun-

tain Company producing a lead-silver ore carrying a large percentage of lead.

The Florence Mine, Ainsworth, is expected to make regular shipments from now on. Two cars recently sent to the smelter gave returns of from 75 to 80 per cent lead which is a record for high-grade lead concentrate.

**Wage Agreement** The Western Canada Coal Operators' Association and the miners of District 18, U. M. W. of A. (which district comprises Eastern British Columbia and Alberta) are reported to have renewed their wage agreement for another year, the renewal dating from the 31st. March last. This was the result of a conference held at Calgary early last month.

It is interesting to note in this connection that the Hon. James Murdock, Dominion Minister of Labour, has replied to the Associated Boards of Trade of Eastern B.C. that, in view of this settlement of the wage question, it will be impossible for the federal department of labour to do anything definite towards probing the alleged high cost of western coal production. The Associated Boards passed a resolution at a recent convention held at Trail declaring that the excessive cost of coal and coke was proving a handicap to industry, that the policy of Alberta coal miners was dictated by United States labour leaders, and that it was important that official cognizance of the situation should be taken by the ordering of a thorough investigation.

**Jingle Pot Mine** — The new "Jingle Pot" or "Grant's Mine", which has been opened up near Nanaimo, gives promise of becoming a considerable producer. Surface plant, including railway facilities, wharf and bunkers on the waterfront close to the City of Nanaimo, was taken over from the old and now abandoned "Jingle Pot." It is in good shape and quite adequate to handle the output of the new workings. The hoisting slope has been driven to a fine five-foot seam of coal and as soon as places can be opened up the property will be shipping continuously and in substantial quantities.

**Coal Miners Punished** — Since the disaster of last February in No. 4 Mine, Canadian Collieries (D) Ltd., Cumberland B.C., there have been a number of prosecutions for infractions of the "Coal Regulation Act" on the part of underground workers. In one case Mike Bulatovich, a Montenegrin miner, was fined \$10 and costs for taking into the mine a Wolf safety lamp that had not previously been examined by a competent person. The accused said he had taken the lamp in to the mine by mistake and on discovering the mistake had put it out. A Chinaman, How On, was sent to jail for thirty days for taking underground a key to an electric safety lamp. He stated that he had picked it up on the street and had forgotten that it was in his possession. It is understood that other prosecutions under the Act are to be called shortly.

## EXPLOSIVES IN UNITED STATES IN 1922

The quantity of explosives sold in the United States during the calendar year 1922 was greater by more than 16 per cent than the amount sold in 1921. Report received by the Bureau of Mines, Washington, show that the total sales amounted to 431,772,077 pounds as compared with 372,107,503 pounds the year before. Of the total amount sold 178,866,225 pounds was black

blasting powder, 209,476,084 pounds high explosives other than permissible explosives, and 43,429,768 pounds permissible explosives. Permissible explosives are those that, because of having passed certain tests prescribed by the Bureau of Mines, are considered reasonably safe for use in gaseous and dusty coal mines.

The coal-mining industry is always the largest consumer of black powder and permissible explosives, the consumption usually comprising about 85 per cent of the entire amount manufactured. In 1922 the coal mines used 6,190,478 kegs or 154,761,950 pounds of black powder, as compared with 5,613,435 kegs or 140,335,875 pounds in 1921. In 1922 the coal mines used 25,497,758 pounds of high explosives other than permissibles as against 34,231,542 pounds used 1921. The coal-mining industry in 1922 used 43,429,768 pounds of permissible explosives compared with 38,055,650 pounds of permissibles used in 1921.

Metal mining and all other mining operations (excluding coal) in 1922 used 167,700 kegs or 4,192,500 pounds of black powder as compared with 184,792 kegs or 4,619,800 pounds used in 1921. In 1922 the same mining industries used 78,074,489 pounds of high explosives other than permissibles and 1,452,500 pounds of permissible explosives as against 50,977,366 pounds of high explosives and 881,710 pounds of permissible used in 1921.

The coal reserve of Spitzbergen is estimated to be 10,000 million tons. The production in 1922 was 210,000 tons, and was due mainly to American enterprise. The mining community comprises about 500 persons.

The British China clay production in 1922 was 745,000 tons, against 350,000 tons in 1921, and 900,000 tons in 1912, a record year. About 250,000 tons annually is shipped to the United States.



## PURCHASE OF GOLD ORES

The attention of prospectors and others is drawn to the provision in the Mining Act of Ontario authorizing the Department of Mines to purchase parcels of gold ore taken out by prospectors and others in developing or working mining claims. Arrangements have been made by which such parcels of gold ore, whether large or small, will be accepted by the Temiskaming Testing Laboratories at Cobalt, and paid for according to the schedule provided for the purpose. The Laboratories are operated under the auspices of the Department of Mines.

This offers a first class opportunity for testing the value of ores on a large scale, and also of turning ore of good quality into money for carrying on further development work. By special arrangements, on less than carload lots, freight rates on the T. & N. O. Railway are reduced 50 per cent.

The Laboratories are also equipped for working out the best methods of treatment for gold or silver ores of a refractory or unusual character.

Full information as to treatment charges, schedule of payments, etc., can be obtained from the undersigned, or from A. A. Cole, Manager, Temiskaming Testing Laboratories, Cobalt, Ontario.

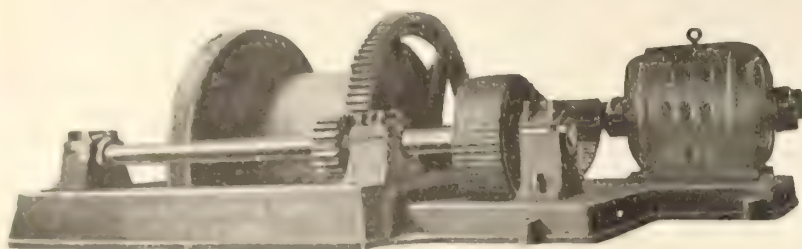
THOS. W. GIBSON,

Deputy Minister of Mines.

Toronto, 12th March, 1923



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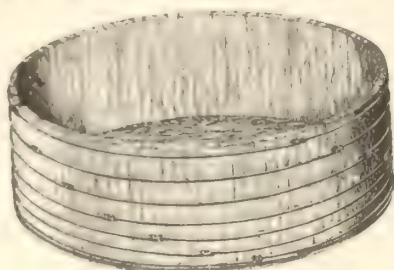
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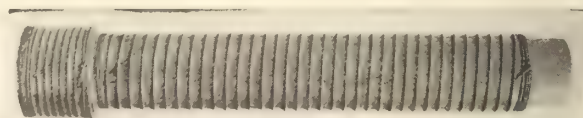
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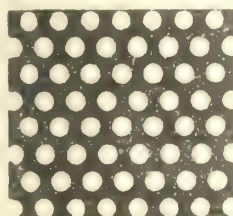
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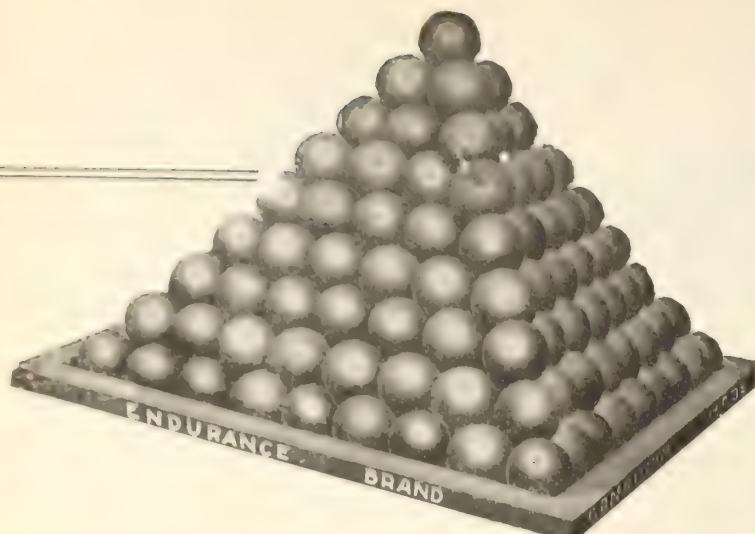
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- Cobalt Oxide:**  
Everitt & Co.
- Compressors—Air:**  
Belliss & Morcom, Ltd.  
Canadian Ingersoll-Rand Co., Ltd.  
Denver Rock Drill Mfg. Co.  
Herbert, Alfred, Limited  
Holman Bros., Ltd.  
Laurie & Lamb.  
Smart-Turner Machine Co.  
Peacock Brothers, Limited.
- Concrete Mixers:**  
Gould, Shapely & Muir Co., Ltd.
- Condensers:**  
Canadian Ingersoll-Rand Co., Ltd.  
Smart-Turner Machine Co.  
Belliss & Morcom, Ltd.  
Laurie & Lamb.  
Peacock Brothers, Ltd.
- Concentrating Tables:**  
Herbert, Alfred, Limited  
Holman Bros., Ltd.  
The Mine & Smelter Supply Co.
- Condensers—Electrical Static & Power:**  
Griswold & Co.
- Consulters and Engineers:**  
Milton Hersey Co., Ltd.
- Conveyors:**  
Canadian Link-Belt Co., Ltd.  
Canadian Mead-Morrison Co.  
Jones & Glassco (Regd.).
- Conveyor Belts:**  
Gutta Percha and Rubber, Ltd.
- Conveyor Flights:**  
Canadian Link-Belt Co., Ltd.
- Conveyor—Trough—Belt:**  
Canadian Link-Belt Co., Ltd.  
Hendrick Mfg. Co.  
Jones & Glassco, Regd.
- Copper:**  
Consolidated Mining & Smelting Co.
- Couplings:**  
Hans Renold of Can., Ltd.
- Cranes:**  
Canadian Link-Belt Co., Ltd.  
Canadian Mead-Morrison Co.  
Peacock Brothers, Limited  
Smart-Turner Machine Co.
- Crane Ropes:**  
Allan Whyte & Co.  
Canada Wire & Cable Co.  
Greening, B., Wire Co., Ltd.
- Crucibles:**  
The Mine & Smelter Supply Co.
- Crusher Balls:**  
Canada Foundries & Forgings, Ltd.  
Herbert, Alfred, Limited  
Holman Bros., Ltd.  
Hull Iron & Steel Foundries, Ltd.  
Peacock Brothers, Limited.  
The William Kennedy & Sons, Ltd.
- Crushers:**  
Canadian Ingersoll-Rand Co., Ltd.  
Herbert, Alfred, Limited  
Holman Bros., Ltd.  
Hull Iron & Steel Foundries, Ltd.  
Wettlaufer Bros.  
Lyman, Limited  
The Mine & Smelter Supply Co.  
Hadfields, Limited
- Cut Gears:**  
Hans Renold of Can., Ltd.  
Jones & Glassco, Regd.  
The William Kennedy & Sons, Ltd.
- Cyanide:**  
Cyanide Plant Equipment:  
The Door Co.  
The Mine & Smelter Supply Co.
- Derricks:**  
Smart-Turner Machine Co.
- Diamond Drill Contractors:**  
Smith & Travers  
Sullivan Machinery Co.
- Digesters:**  
Can Chicago Bridge & Iron Co., Ltd.  
Horton Steel Works, Ltd.
- Diesel Engines:**  
Belliss & Morcom, Ltd.  
Laurie & Lamb.
- Dies:**  
Canada Foundries & Forgings, Ltd.  
Herbert, Alfred, Limited  
Hull Iron & Steel Foundries, Ltd.  
Holman Bros., Ltd.
- Drain Tile:**  
Wettlaufer Brothers.
- Dredges:**  
Canadian Mead-Morrison Co.
- Dredger Pigs:**  
Hull Iron & Steel Foundries, Ltd.
- Dredging Machinery:**  
Hadfields, Limited  
Hull Iron & Steel Foundries Ltd.
- Cages:**  
Canadian Ingersoll-Rand Co., Ltd.  
The Mine & Smelter Supply Co.  
Herbert, Alfred, Limited.  
Holman, Ltd.  
The William Kennedy & Sons, Ltd.
- Cables—Wire:**  
Standard Underground Cable Co. Ltd.  
Canada Wire & Cable Co.
- Cable Railway Systems:**  
Canada Wire & Cable Co.
- Cam Shafts:**  
Canada Foundries & Forgings, Ltd.  
Hebert, Alfred, Limited  
Holman Bros., Ltd.  
Hull Iron & Steel Foundries, Ltd.  
Peacock Brothers, Ltd.  
The William Kennedy & Sons, Ltd.
- Car Dumps:**  
Canadian Mead-Morrison Co.  
Herbert, Alfred, Limited.  
Holman Bros., Ltd.  
Sullivan Machinery Co.
- Cars:**  
Canadian Mead-Morrison Co.  
Herbert, Alfred, Limited.  
Holman Bros., Ltd.  
John J. Gartshore.  
Peacock Brothers, Limited.  
The William Kennedy & Sons, Ltd.
- Car Pullers:**  
Canadian Mead-Morrison Co.
- Car Wheels and Axles:**  
Herbert, Alfred, Limited.  
Holman Bros., Ltd.  
Hull Iron & Steel Foundries, Ltd.  
John J. Gartshore.  
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The William Kennedy & Sons, Ltd.
- Carriers (Gravity):**  
Jones & Glassco, Reg.
- Cast Steel Gears:**  
Canada Foundries, Ltd.  
The William Kennedy & Sons, Ltd.
- Castings (Iron and Steel):**  
Herbert, Alfred, Limited.  
Holman Bros., Ltd.  
Hull Iron & Steel Foundries, Ltd.  
Peacock Brothers, Limited.  
The William Kennedy & Sons, Ltd.
- Cement Machinery:**  
Hadfields, Limited.  
Hull Iron & Steel Foundries, Ltd.  
The William Kennedy & Sons, Ltd.
- Chains:**  
Jones & Glassco, Reg.  
Canadian Link-Belt Co., Ltd.  
Greening, B. Wire Co., Ltd.
- Chain Drives:**  
Jones & Glassco (Regd.)
- Chain Drives—Silent and Steel Roller:**  
Canadian Link-Belt Co., Ltd.  
Hans Renold of Can., Ltd.  
Jones & Glassco (Regd.).
- Chemist:**  
Thos. Heyes & Sons.  
Milton Hersey Co.  
Ledoux & Co.
- Chrome Ore:**  
Everitt & Co.
- Crusher Jaws:**  
Canadian Steel Foundries, Ltd.  
The William Kennedy & Sons, Ltd.
- Crushing Rolls:**  
Canadian Steel Foundries, Ltd.  
The William Kennedy & Sons, Ltd.
- Classifiers:**  
The Dorr Company
- Clutches:**  
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- Coal:**  
Dominion Coal Co.  
Nova Scotia Steel & Coal Co.
- Coal Cutters:**  
Sullivan Machinery Co.  
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Hebert, Alfred, Limited  
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- Coal Crushers:**  
Canadian Link-Belt Co., Ltd.  
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- Coal Mining Machinery:**  
Canadian Ingersoll-Rand Co., Ltd.  
Canadian Rock Drill Co.  
Denver Rock Drill Lfg. Co., Ltd.  
Sullivan Machinery Co.  
Hadfields, Limited.  
Hendrick Mfg. Co.  
Hebert, Alfred, Limited  
Holman Bros., Ltd.



- Pipes:**  
Consolidated Mining & Smelting Co.
- Coal and Coke Handling Machinery:**  
Canadian Locomotive Co. Ltd.
- Coal Pick Machines:**  
Canadian Locomotive Co. Ltd.  
Herbert, Alfred, Limited  
Peacock Bros., Ltd.  
Sullivan Machinery Co.
- Forges:**  
Canadian Steel Foundries, Ltd.  
Hull Iron & Steel Foundries, Ltd.  
J. Hartshore
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- Gasoline Engines:**  
Bellis & Morcom, Ltd.  
Laurie & Lamb
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Canadian Locomotive Co. Ltd.  
Sullivan Machinery Co.
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Jones & Glasco, Regd.  
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Sullivan Machinery Co.
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Denver Rock Drill Mfg. Co., Ltd.  
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Laurie & Lamb.  
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- Metallurgical Machinery:**  
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- Roller Chain:**  
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Canadian Link-Belt Co., Ltd.  
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- Rope—Manilla & Jute:**  
Jones & Glassco, Regd.  
Allan, Whyte & Co.
- Rope—Wire:**  
Anglo Canadian Wire Rope Co.  
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Dominion Wire Rope Co., Ltd.  
Greening, B. Wire Co.
- Rolls—Crushing:**  
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- Screens—Perforated Metal:**  
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- Transmission Appliances:**  
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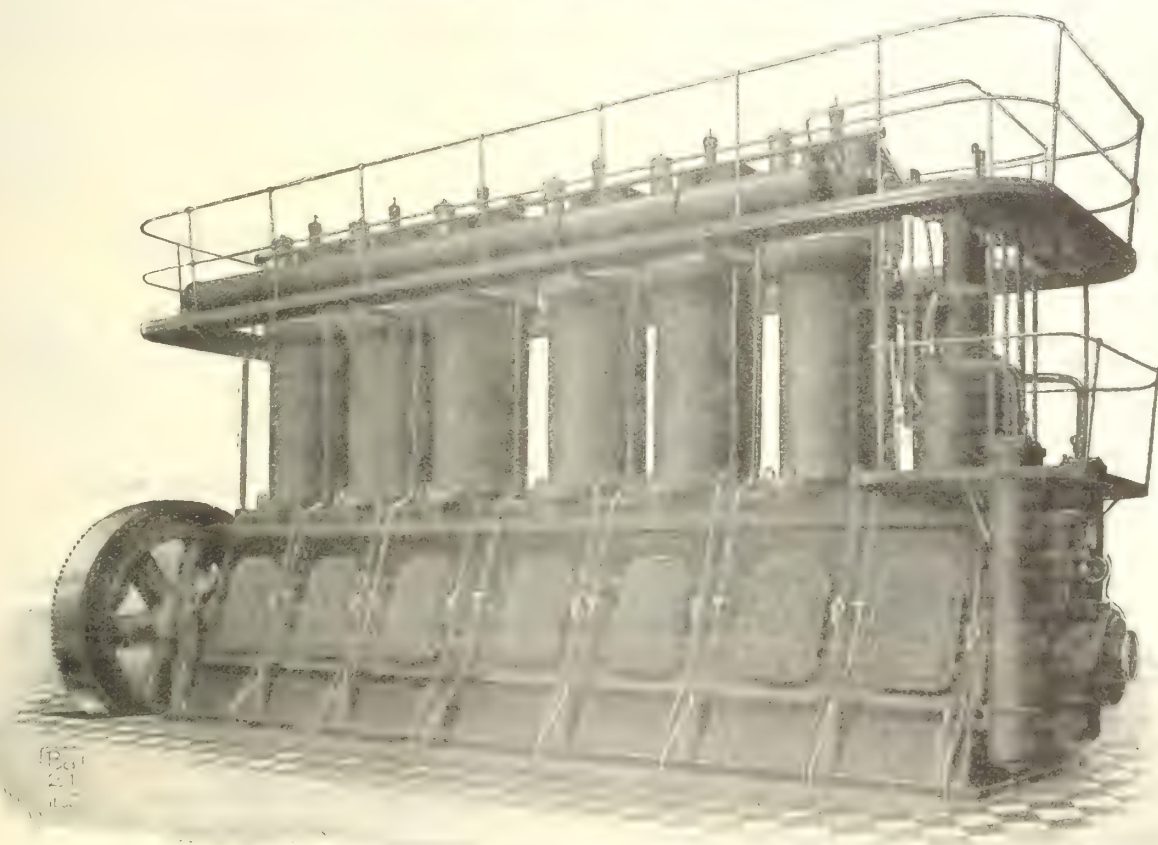
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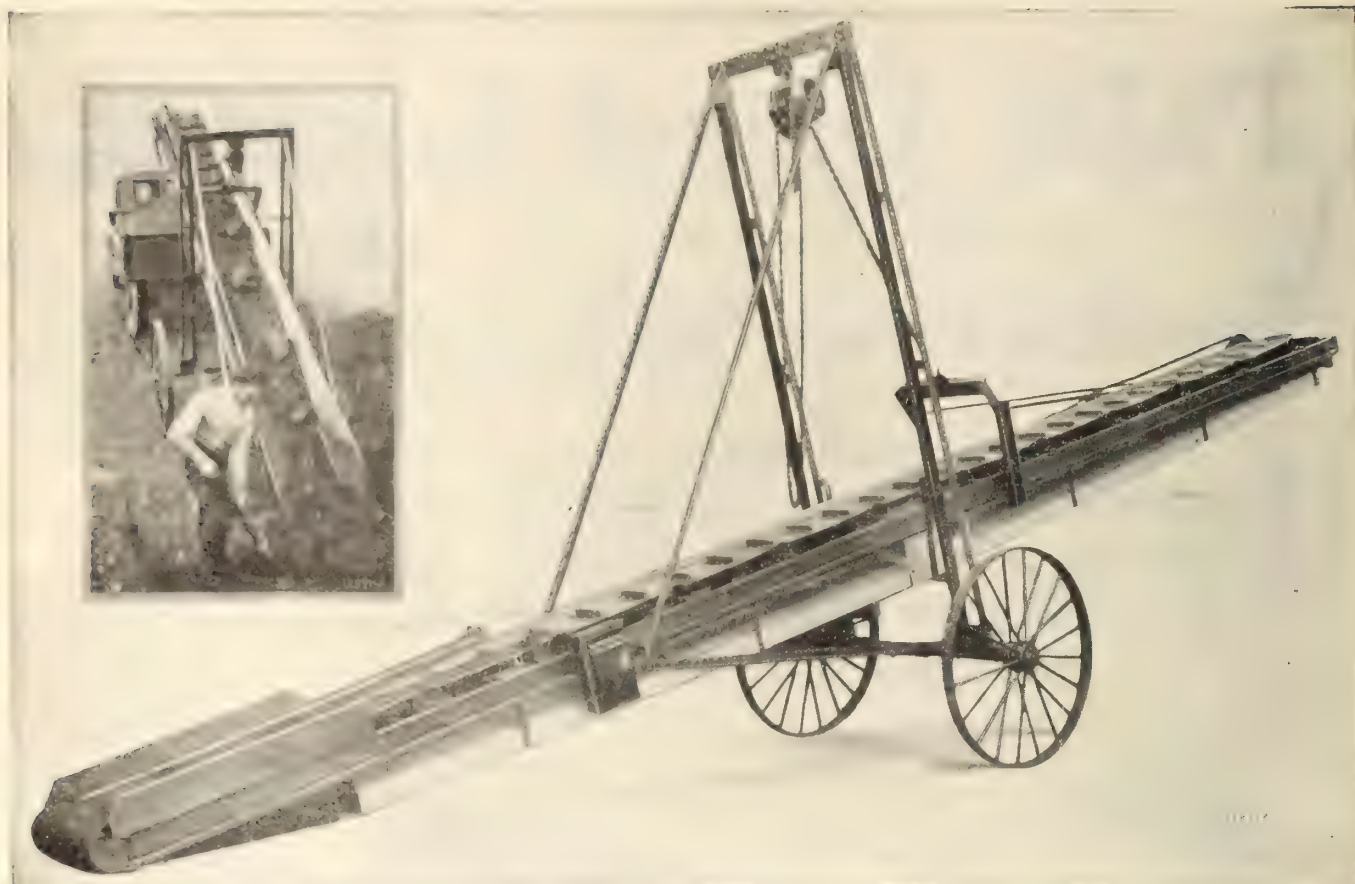
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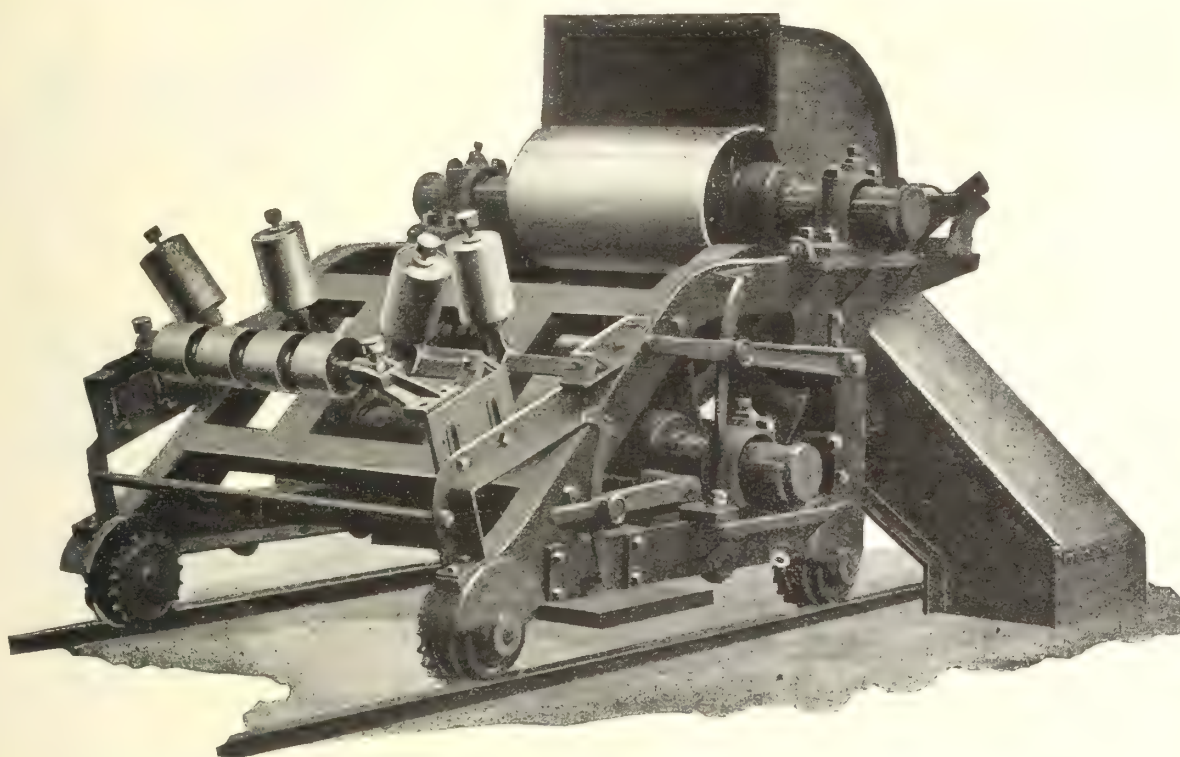
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# Ontario's



PROVINCE OF ONTARIO

# Minerals

DEPARTMENT OF MINES

HON H. MILLS, Minister of Mines

## Mineral Areas.

Ontario, with its 407,262 square miles, contains many millions of acres in which the geological formations are favorable for the occurrence of minerals, 70 per cent of the area being underlain by rocks of pre-Cambrian age. The phenomenally rich silver mines of Cobalt occur in these rocks; so also do the far-famed nickel-copper deposits of Sudbury, the gold of Porcupine and Kirkland Lake, and the iron ore of Magpie and Moose Mountain mines.

## Economic Minerals.

In addition to the above, practically all economic minerals (coal and tin excepted) are found in Ontario:—actinolite, apatite, arsenic, asbestos, cobalt, corundum, feldspar, fluor-spar, graphite, gypsum, iron pyrites, lead, mica, molybdenite, natural gas, palladium, petroleum, platinum, quartz, salt, talc and zinc. This Province has the largest deposits on the continent of talc, feldspar, mica and graphite.

Building materials, such as ornamental marble, limestone, sandstone, granite, trap, sand and gravel, lime, portland cement, brick and tile, meet every demand.

## Mineral Production.

Preliminary returns show the output of the mines and metallurgical works of the Province for the year 1921 to be worth \$48,128,387, of which the metallic production was \$27,574,202.

The following figures show the rapid growth of Ontario's mineral industry by five-year periods since 1891:

| Year.          | Value.      | Year.          | Value.       |
|----------------|-------------|----------------|--------------|
| 1891 . . . . . | \$4,705,672 | 1906 . . . . . | \$22,388,383 |
| 1896 . . . . . | 5,235,003   | 1911 . . . . . | 41,976,797   |
| 1901 . . . . . | 11,831,086  | 1916 . . . . . | 65,303,822   |

## Dividends.

Dividends and bonuses paid to the end of 1921 amounted to \$23,140,734 for gold mining companies, and \$84,388,185 for silver mining companies or a total of \$107,528,919.

## Mining Regulations.

A miner's license costs \$5.00 per annum, and entitles the holder to stake out in any or every mining division three claims of 40 acres each. After performing 200 days' assessment work on a claim, patent may be obtained from the Crown on payment of \$2.50 or \$3.00 per acre, depending on location in unsurveyed or surveyed territory.

## Assay Office.

The Provincial Assay Office at No. 5 Queen's Park, Toronto, is maintained by the Department of Mines for the free identification of minerals, free assays under the provisions of the Mining Act of Ontario, and also for general assay work as per the Schedule of Charges which may be obtained on application.

## Temiskaming Testing Laboratories

The Department maintains, at Cobalt, an ore sampling and testing laboratory which is now prepared to receive parcels of gold ore from 100 pounds upward, and after sampling and assaying the same to pay to the shipper the value thereof, less treatment charges. The purpose is to afford a market for ores extracted by prospectors and others in developing their mining claims, enabling them to obtain funds which they can use for further work and to report on the most satisfactory method of treatment. Fuller information may be obtained on application to the Manager, Temiskaming Testing Laboratories, Cobalt, Ontario.

## Publications.

For list of publications, illustrated reports, geological maps and mining laws, apply to

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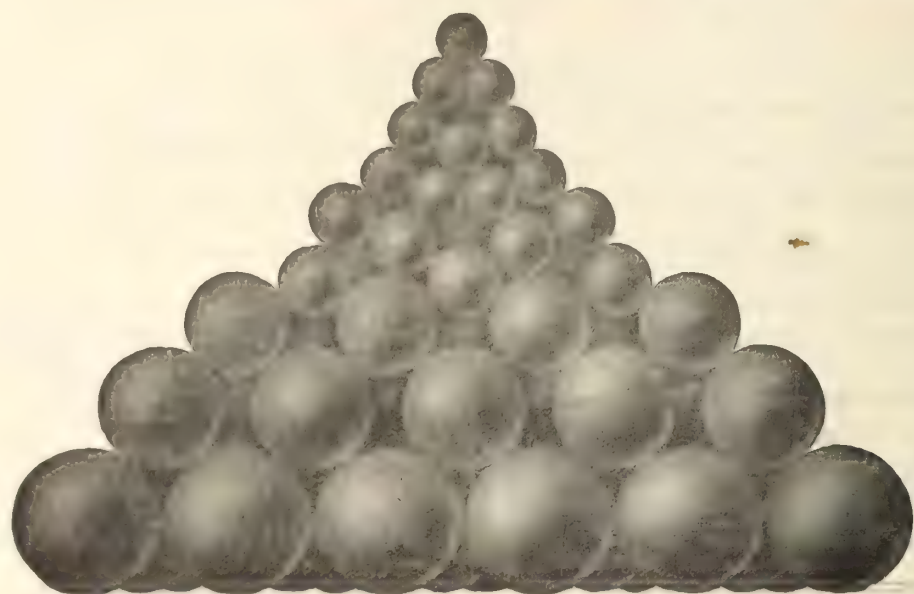
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to their progress in Canada*

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No. 17

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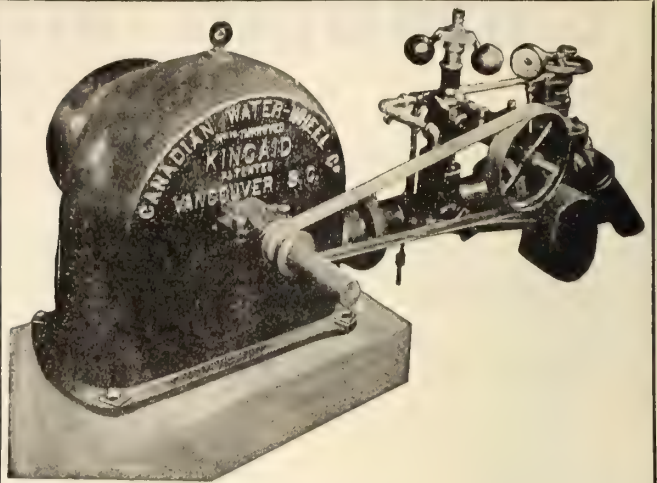
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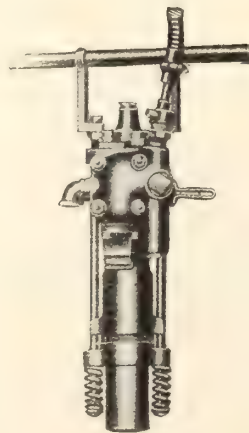
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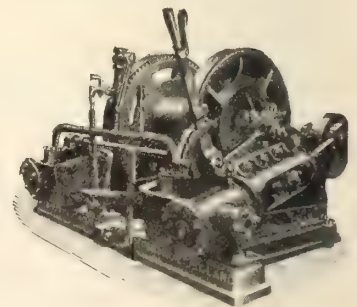
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# :-: EDITORIAL :-:

## THE INSTITUTE AND THE PUBLIC

The Canadian Institute of Mining and Metallurgy owes to itself, to the mineral industry of Canada and to the Canadian public a duty that at present it is making no serious attempt to perform.

In recent weeks we have discussed briefly in these columns the present lack of an effective contact between the mining engineers of this country, as representing their industry, and the population at large, whose interests the mining industry is designed to serve. We have alluded to the absurd misconceptions that comprise the average Canadian's ideas of the mineral industry of his country, and have pointed out some possible means whereby those engaged professionally in the industry can, by word and deed, help to correct these false impressions. We have likewise adverted to the fact that a great deal of good can be done by displacing in the public press a large part of the present mining "news" with authentic information, just as interesting and readable, provided by a publicity officer in the Department of Mines at Ottawa.

Last month we had a demonstration of the genuine influence of which the Canadian Institute of Mining and Metallurgy is capable, when its energies are directed into a channel big enough to hold them. The symposium on fuel supply, presented at a critical time, not only served to collect authentic and comprehensive data on the subject, but also proved to be a crystallizing force for public opinion. By means of the papers presented, the discussion that followed and the widespread publicity given the meetings in the public press, all Canada knew, almost before the meetings had been concluded, that cheap transportation of Alberta coal is at the heart of our problem and that the substitution of coke for anthracite is likely to ensure at all times an adequate supply of domestic fuel in the "acute fuel area". The Institute did the country a notable service at the recent annual meeting.

A similar opportunity, on a grander scale, awaits the Institutes' attention now. The eyes of the world are turned to Canada as the favoured land of the day. Our mining industry particularly is attracting attention. A movement of capital in large amounts to our mining camps, established and in embryo, has already commenced. It is possible, and indeed probable, that this inflow of the capital required to exploit our mineral areas will reach vast proportions. Meantime Cana-

dian capital in amounts very creditable to our young country and our still younger mining industry is finding its way to mine and prospect.

Where does the Institute come in as a factor in this development? At present, we fear, it does not cut much of a figure. This is not from lack of ability or for lack of opportunity, but merely from neglect to delineate clearly a self-appointed task and then to bend its back to the work. Let us consider squarely a few random points in this connection.

Mining investors with large sums of money to spend are rapidly finding, and making, opportunities for putting their funds into the "game" in Canada. They are well able to look after themselves, in every way. They are a gregarious breed, and now that Canada is the vogue in mining, we shall have an increasing number of them, principally from Great Britain and the United States. Their exploring and mining operations have already provided the reason for the growing popular interest in the mineral industry, which we may expect soon to assume boom proportions.

It is this popular interest in mining for which the Institute can, and should, assume a certain measure of responsibility. A boom period invariably provides a golden opportunity for the vendor of useless mining claims, the fake promoter, the stock-jobber, the manipulator of stocks, and the whole light-fingered breed. Preventive laws can at best merely palliate the evil. A certain proportion of sheep are sure to be shorn. Those susceptible of protection against fraud can best be served if they are offered the truth about the mineral industry along with the falsehood that is bound to circulate in some degree. We hold that, if the truth is made as readily available as is falsehood, it will displace it to a very large extent.

This is one point, among many, to which the Institute can bend its energies with benefit to itself, the profession, the mineral industry and the country. The headquarters can duplicate, not once but many times, the success of last month's effort. By adopting similar means the branches in our various mineral districts can collect similarly authentic and authoritative data, each on its own resources and its local problems. The means are available, for the asking, to circulate such information broadcast throughout Canada.

The Institute set a mark for itself in its recent annual meeting. Its labours on behalf of the industry and the Canadian public have borne fruit already. We can repeat this service to ourselves and to our country



by tackling one after another of the serious public problems that confront us. Let us measure up to the standard we have set.

### A PICTURE OF CANADA

Canada's future is bound up inextricably with the production of mineral wealth. This has been realized fully as yet only by a handful of Canadians. A larger number have a dim comprehension of this vital phase of the problem of our national development. Most Canadians still fail to grasp its true significance.

Dr. Corless has added to his already notable service as a public proponent of our mineral industry. On Monday of last week he delivered before the Canadian Club in Toronto the address of which we print the first instalment today. In it he has painted in bold strokes the physiographic and geological map of Canada. He shows the great interior continental plain, flanked on either side by mountains, terminated abruptly in Ontario and Quebec near their southern borders by the pre-Cambrian shield, and squeezed to rapidly diminishing dimensions northward from the international boundary in our prairie provinces. It is upon this small share of the fertile interior plain that Canada's world importance as an agricultural country must rest.

The remainder of our country — by far its larger part — is composed of regions of hill, lake and mountain, interspersed with fertile valleys, and an occasional feature like the Great Clay Belt of northern Ontario and Quebec. Settlers in these scattered areas must look to local markets for the profitable sale of their produce. The mineral industry will form the most secure, as well as the most profitable, basis for such a market. Dr. Corless shows by citation of fact and by logical deduction, that we are assured of a mineral industry adequate to this need. It remains for us all to help develop it each in the way suited to his ability and his opportunity.

### THE "BLUE SKY" BILL IN ONTARIO

"The only freedom I care about is the freedom to do right; the freedom to do wrong I am ready to part with on the cheapest terms to anyone who will take it off me."

So wrote Huxley at a time when scientific truth had commenced its struggle for power, but while error still held sway in the land. His conclusion can be applied with equal aptitude to the movement now under way on this continent to protect the helpless and the unwary from the schemes of the dishonest promoter and stock-jobber.

The present government of Ontario has made an honest and straightforward attempt to put on the statute books a so-called "blue sky law," designed with an object that every honest citizen will approve. To

such a law there can be made objection only by two classes of persons, — those whose illicit transactions would be thus curtailed, and those who consider that the law in question is not the best means of effecting the object in view. We can afford to ignore those who are willing to "let well enough alone"; for in this case they either are wilfully blind to the need of adequate policing of public financial operations, or they have neglected to study the matter and have passed judgment without having first informed themselves. Consequently the task of those advocating this protective measure is reduced to convincing those interested that the present bill is the proper expedient. As the measure is non-controversial in the way of party politics, we can reasonably hope that the pending provincial election will not interfere with its transference to the statute books, either before or after the election.

The present laws in Ontario dealing with the public sale of stock have been proved quite inadequate for the effective administration of justice. This has been proved time and again during recent years, when conviction or even legal action for fraud have been prevented by the many "loop-holes" of which those guilty of fraud have taken advantage. The present bill is designed to stop these gaps in the law and to provide some simple additional measures of precaution. It proposes, in brief, to force every promoter, broker and salesman to put his cards on the table, so that the prospective buyer of stock may judge fairly their value. It imposes no restriction on promotions other than this, and offers no guarantee to the investor. It merely insists, throughout its various sections, that the truth be told and that falsehood be excluded. Surely this is a worthy object, and without danger to any honest man.

The bill, as presented at its second reading on April 6th, covers fifteen pages, most of this space being occupied by items necessary to ensure proper legal interpretation. The gist of the bill is that every issuer of securities shall submit to the scrutiny of a commissioner of securities a statement, verified by competent business and technical authorities, describing the physical basis of the issue of stock and the method and conditions of issuance. It provides likewise that every stock salesman shall be licensed, and shall give to every buyer of stock a prospectus setting forth plainly the essential information contained in the statement filed. The statement is to include such information as the purposes to which the proceeds of the stock issue is to be applied; the amount of vendor stock issued; the capital liabilities of the company; the interest of each director in the promotion itself or in any property it is proposed to acquire. It protects the reporting engineer from garbled reports by specifying that he be quoted verbatim. It also proposes that advertisements in newspapers and other periodicals shall be subject to the same scrutiny and regulation as are prospectures.



The bill, while designed as a general measure of protection against fraudulent issues of stock, takes special cognizance of mine promotions. The country needs this protection now and will need it more during the mining boom that is pending. We see in it nothing essential to which we can take exception, and much that will help improve the status of the mining industry. In one place it requires a report from a "registered professional mining engineer." Many mining engineers object to registration in the provincial associations, but all are registered in the Canadian Institute of Mining and Metallurgy, and no doubt this latter registration comes under the meaning of this clause. The bill deserves the support of the whole Canadian mining fraternity.

In evidence given recently before the Senate committee on fuel a gasworks manager stated that the output of coke from his plants was relatively small, due to the comparatively small demand for gas under present conditions. This draws attention to the inherent weakness of the old-time gasworks. It can supply gas only at a price that cannot compete with solid fuels. It makes good gas and good coke, but it cannot make either so cheaply as does the modern by-product coke oven plant nor does it make so good a recovery of by-products. The time is now at hand when the by-product plant will displace entirely the old style gas plant, providing coke in competition with anthracite coal, gas at a rate very much below its present cost, and by-products in such abundance as to stimulate our chemical industries and the use of artificial fertilizers in intensive farming. The price of gas will have to be reduced to a point where it can be used for heating, as is fuel oil at present; and this lower price will induce a domestic consumption much more extensive than at present.

The expansion of our mineral industry depends in the first instance upon the efforts of the prospector. He should be preceded, as well as accompanied in his search, by the geologist, who can best mark out for him the broad lines of his search and interpret what would otherwise be puzzling bits of evidence. We give today some hints to prospectors from Mr. George Clothier, resident government engineer in charge of the Portland Canal district of British Columbia. Hints from public servants like Mr. Clothier have proved to be so prolific of practical results that there is no doubt many of the prospectors who will swarn round the Premier Mine will follow his advice. Every effort such as this, that tends to lessen a useless concentration of men round proved areas is effort well expended. To point out to prospectors promising areas on the outskirts, and beyond, is a genuine public service.

The market for nickel has revived with wonderful rapidity since the dull days of the recent industrial depression. It is truly remarkable that, with the former outlet by way of armour-plate and munitions of war virtually blocked, the industrial use should have been increased to their present extent. This has not been done without determined effort, judiciously directed, on the part of the staffs of the three nickel companies. A large part of the credit for this revival must be placed to the credit of research work. Particularly is this the case with the British America Nickel Corporation, the latest of the three companies to resume active operations. When the work of this company's metallurgists is recorded publicly, it will provide an intensely interesting story — a story such as will stimulate similar faithful endeavour among those with similarly hard problems to solve. We are glad to see this research work about to be translated into commercial activity at Nickelton and Deschenes.

As we go to press, word comes of the sudden and shameful outbreak of lawlessness in the mining camps of Thetford. Evidently Sydney has no monopoly of Canadian Bolsheviks.

## DISPARAGERS

### A Ditty of Indictment

Let us with a cheerful mind  
Cherish hopes when so inclined:  
Disregard the croaking gent  
Who insists the world's hell-bent.

\* \* \*

When Porcupine first came to view  
It was admired by very few;  
The greatest experts looked askance  
And scarce vouchsafed a second glance.  
And South Lorrain, in earlier days,  
Received no whit of expert praise.  
In Cobalt, too, the like occurred—  
Few savants spoke a cheering word.  
So, likewise, out in far B. C.,  
Portland Canal was marked N. G.  
Well, as the vulgar minstrel sings,  
Look now upon the bleeding things!  
Discredited and damned by those  
Who must preserve their cautious pose,  
They yet survive and blossom forth  
To attest the glory of the North.

\* \* \*

Good it is to cherish hope  
When it's based on reasoned dope.  
Even Labrador may be  
Added to our galaxy!

### Editor's Note:—

Really, we must call a halt—  
Take those last two lines with salt!

J. C. M.



# Some of Canada's National Problems\*

AND THEIR PHYSIOGRAPHIC CAUSE

By C. V. CORLESS\*\*

## Introductory

Not only is man a denizen of the earth; he derives from it his physical origin and sustenance. But the course of his evolution has been such that, for his food and raiment, he finds himself dependent on pre-existing forms of life. Only all-essential air and water and minute quantities of minerals is he able, for his subsistence, to take directly from the hand of his mother earth.

Originally, therefore, man was, from sheer necessity, a hunter for the materials of his food and clothing. Only later, through pressure of increasing numbers, did he learn to domesticate and pasture animals, and finally to till the soil, thus lessening the precariousness of his existence. The pangs of hunger and the impulse to propagate his species — those primitive urges that constitute the greatest and most universal ultimate stimuli to war, and to progress in peace — are the primary forces driving him to seek out and develop lands suitable for cultivation. Little, therefore, is it to be wondered at, that man's first thought regarding any part of the earth is concerned with its surface, soil and climate, since these determine its suitability for cultivation. Food and raiment, the conditions of our continued existence, must forever receive our first attention.

## Reasons for Emphasis on Agriculture

These considerations suggest the primary reason why, so far, we have looked almost exclusively to Canada's farming lands as the greatest potential source of her future wealth. But a strong secondary influence has seriously affected our opinion of the relative extent and importance of Canada's agricultural area. The greatest store of agricultural wealth yet developed on our planet is the central plain of North America, of which Canada's three most extensive farming areas are northward extensions, viz., Southern Quebec, Southern Ontario, and the cultivable parts of the Prairie Provinces. It was only natural that, at first, we should regard our relatively small parts of this plain as if they had expansiveness similar to the great body of it south of the international boundary.

## Limitations to Agriculture; The Laurentian Highland

But, aside from the limiting effect of climate, as we go northward there is a very important factor that must be carefully considered before the prevailing view of the vast extent of Canada's total agricultural area can be accepted without qualification. The great, northward-expanding, funnel-shaped, agricultural plain of North America, flanked by the Appalachian Highland on the east and the Pacific Highland on the west, is, as it were, nearly plugged to the northward by the greatest of Canada's physical features, the so-called Laurentian Highland, which occupies well over one-half the area of the entire country.

Those eastern and western bulwarks or sea-walls of the North American Continent, as we go northward, diverge so rapidly that, measured along the 49th parallel, the interval between them is more than 2,000 miles. Of this interval, more than 60% at this latitude is blocked by the Laurentian Highland, which thus narrows the Canadian section of the central plain at Winnipeg to about 800 miles. Nor does the narrowing end here. Near the northern end of Lake Winnipeg the outer margin of the Laurentian Highland turns sharply westward, crosses Saskatchewan and, turning northwestward, even nips a corner of 2,000 square miles off Alberta, thus further lessening the width of the central plain, measured along the 60th parallel (the boundary between the Prairie Provinces and the North West Territories), to about 400 miles. North of this parallel, the central plain narrows still further to 200 or 300 miles, where it becomes little more than the mere valley of MacKenzie River. Of this vast central plain of the continent, the greatest storehouse of farming wealth in the world, this enormous Laurentian plug leaves to Canada only the southern tip of Ontario, with which you are so familiar, having an area of but 35 or 40 thousand square miles; a similar area comprised of southern Quebec and the eastern corner of Ontario, separated from the Ontarian tip by a southward spur of the Laurentian into New York State; and the tapered western area just outlined chiefly within the Prairie Provinces.

It is this vast Laurentian Highland, nearly equal in area to 60 percent of Canada's mainland; so little known; so little understood; so generally ignored; and yet, because of its geological history and structure, its geographical position, and its great area, of so vital importance in our national development; to which I wish to invite your attention for a few minutes.

## Extent of the Laurentian Highland

When you take your summer outing in Muskoka, you enter this highland about 75 miles north of Toronto. If you go to Winnipeg, you are travelling over it from Orillia to within a few miles of your destination. When you are in Muskoka, it stretches north-easterly from where you are located for more than a thousand miles, and north-westerly for more than two thousand miles. If you take your summer holiday by a sail down lake, rivers, and gulf, to Belle Isle Strait, the Laurentian Highland is never more than a few miles from the north shore past which you are gliding; you cross a spur from it into New York State, where the St. Lawrence breaks through forming the beautiful Thousand Islands; you are only thirty miles from its southern rim at Montreal; it steadily approaches the shore as you continue down the river until, from a point a few miles east of Quebec City, it forms the bold and somewhat forbidding shoreline of river and gulf for the remaining eight hundred miles. To your right as you leave Cornwall, Montreal and Quebec behind, lie, first, the agricultural plain of Quebec,

\* Address to The Canadian Club, Toronto, April 16th, 1923.

\*\* Director and Manager of the Mond Nickel Company.

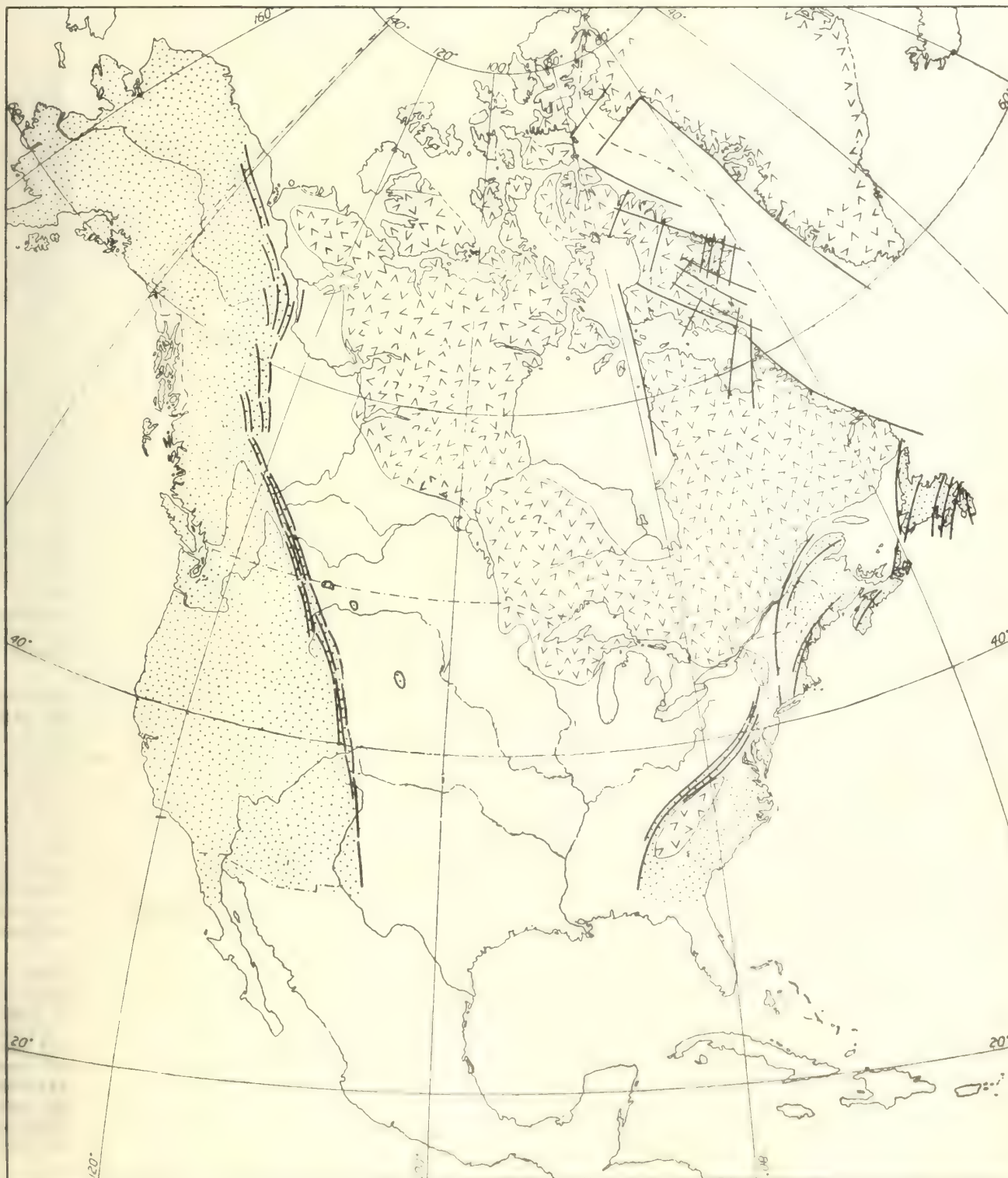


noted for its fertility and for the thrift and contentment of its people; and next, the Acadian Highland, the Canadian extension of the Appalachian Highland, which spreads out into Gaspé Peninsula and the three Maritime Provinces, before disappearing under the waters of the Gulf. This whole area to your right, including plain, peninsula, and provinces by the sea, totals only about two and one-half percent of Canada; while to your left you were passing Canada's greatest physical feature, spread out over more than twenty

times this area, more than one-half the surface of the entire country, or over an area equal to two-thirds of that of the great country to the south of us.

#### **The Laurentian Highland—the Source of National Problems**

This vast Laurentian Highland, stretching from the St. Lawrence and Atlantic westward to Great Bear, Great Slave, Athabasca, and Winnipeg Lakes; extending from Superior and Huron northward to well within the Arctic Circle; and surrounding that great North-



The above sketch map indicates the general physiographic and geological features of this continent. The fertile interior plain covers only the southwestern peninsula of Ontario and the upper St. Lawrence valley in eastern Canada. In the west it includes Alberta, the southern half of Saskatchewan and a corner of Manitoba. It is flanked by mountains on the east and west. The northern half of the continent is occupied mainly by the pre-Cambrian "shield" round Hudson's Bay. Within this vast area the products of the forest and mine will always be the principal inducement to human habitation.



an Mediterranean Hudson Bay, which has more than 150,000 square miles of surface; is the physiographical cause of many, if not most, of Canada's greatest national problems. Nor are these problems merely geographical; they are also economic, sociological and political. This great physical feature separates and isolates Canada's western and eastern agricultural populations; it hampers their efforts and lessens the value of their produce; it hinders the unification of ideas; it thus gives rise to divergent political views; it prevents easy assimilation of in-coming peoples; it has baffled our understanding to such an extent that our failure to grasp its meaning, to grapple effectively with it, to seize its rare opportunities, to develop it in place of ignoring or exploiting it, has been and is one of the greatest causes of our steady loss of population; it is also the cause of our fuel problem, at present so urgently demanding solution; and it is, at bottom, the cause of our great railway problem, the solution of which must, in great part, become interdependent with the solution of the fuel problem. From Winnipeg, almost on the contact of prairie and highland, to Toronto, Montreal and Quebec, rail distances of twelve to fifteen hundred miles, our three transcontinental lines traverse this almost unpeopled area. Enormous in extent, most ancient and complex in geological formation, denuded of most of its soil by recent glaciation, this pre-Cambrian Shield, as it is conveniently called in order to remind us of its great geological age, gives rise to a series of profoundly difficult national problems that challenge the intelligence, courage and enterprise of all Canadians who are deeply interested in the development of their country. It is not more rhetorical use of hyperbole to say: If you wish to understand Canada and Canadian problems, study the Laurentian Highland.

### Need of Study of Pre-Cambrian Shield

But this attentive study of Canada's greatest physical feature is precisely the duty that most Canadians have left undone. To our Dominion Government, it has chiefly been a vast barrier, a wilderness to be traversed, rather than opened up, in order to reach and develop western plain and plateau. Our Provincial Governments, much as we appreciate the relatively little they have done, have given scant attention to the needs and resources of 90 percent of their provincial areas, their interest centering rather in taxing than in developing their portions of it. Even our school text-books almost ignore it, dismissing their accounts of more than half of our country with a few brief paragraphs. A few Canadians enter it for a short distance for a summer's outing on one of its myriad lakes, or spend a few days in enjoyment of its wonderful sport with rod or gun. A few more reluctantly traverse its southern fringe on their way to western plain or mountain. And still others confine their study of this great area to the promoter's advertising, making wild plunges in the bogs of misinformation which some of these arm-chair pioneers deliberately create. The great mass of our more intelligent fellow-Canadians know little of, and care even less for, this greater part of their native country. But there are a few others, thank Heaven, having still the red blood and pioneering instinct of the ancient Saxon and Viking, yes, even of our fathers and grand-fathers, coarsing in their veins — courageous and enterprising explorers, geologists, engineers, prospectors,

lumbermen, miners, and other real pioneers — who, undaunted by difficulties, are exploring and deeply studying such parts of this vast area as they can reach and who, within the past quarter century, have already brought to light dazzling visions of undreamed-of wealth in its forests and lying hidden beneath its surface. The period in which we are living is truly the soft age of crowded cities, paved roads, costly limousines, moving pictures; love of ease with corresponding loss of initiative and enterprise; resulting too frequently in soup-kitchens and unemployment doles; and all this, with a vast territory of unlimited opportunity lying undeveloped at our doors.

### Distribution among the Provinces

Let us begin our brief study of the pre-Cambrian Shield, which is spread out over 2,000,000 square miles, by glancing at its distribution among the provinces and territories of Canada. For our purposes, approximations, which stick easily in memory, will be more useful than more exact figures, quickly forgotten.

A small part of the Shield is exposed in some of the eastern Arctic Islands. Of the mainland portion, roughly resembling a great horse-shoe, about one-third fills more than ninety percent of Quebec extending from Hudson Strait practically to the Ottawa and St. Lawrence Rivers. A little more than one-third of the entire pre-Cambrian Shield occupies most of the North West Territories; extending from the northern boundary of the Prairie Provinces, practically to the Polar waters; stretching from Hudson Bay almost to the valley of MacKenzie River; and half surrounding those large north-western glacial lakes, Great Bear and Great Slave, each of which is about 50 percent larger than your own Lake Ontario. Each of these prongs of the vast horse-shoe, the Labrador or north-eastern prong, and the MacKenzie-Keewatin or north-western prong, expands northward to the enormous width of over 1,000 miles.

The remainder of the pre-Cambrian Shield, well over 500,000 square miles in area, being nearly of the same area as British Columbia and Yukon Territory together, is divided about equally between Ontario and the three Prairie Provinces. It fills most of Ontario and Manitoba, which should hardly be called a Prairie Province. It occupies the northern one-third of Saskatchewan; and it surrounds Lake Athabasca, thus filling about 2,000 square miles of the north-easterly corner of Alberta. This lake, which is as long as Lake Ontario, will probably at some future time be an important connecting link in the transportation outlet, via Huson Bay, of Northern Alberta and the Peace River district of British Columbia.

Thus this vast physical feature, roughly equal in area to the entire Pacific Highland or Rocky mountain Plateau from Panama to Alaska, and ten percent larger than India which supports two-thirds of the population of the whole British Empire, directly and profoundly affects every province of the Dominion east of the Rocky Mountains, except the three Maritime Provinces, which have a combined area of only one-fortieth of the pre-Cambrian Shield; and indirectly affects the remainder of Canada, perhaps equally profoundly.

### Climate of the Pre-Cambrian Shield

Though the climate of the Laurentian Highland is fairly well known, a brief summary of climatic conditions may not be out of place. The latitude of this



great area is the same as that of the body of Europe, if we omit the Iberian, Italian and Balkan Peninsulas. The southern part, including most of Labrador, is, relative to the equator, in a similar position to France, Germany, the old Austrian Empire, and Southern Russia; the northern part is in a corresponding position to Scandinavia, Finland and northern Russia. But, owing partly to the configuration of the Atlantic-Arctic Ocean; partly to the presence of an extensive archipelago of large islands off the northern coast-line of North America; and partly to the practical absence of such obstructions off the northern coast-line of Eur-Asia; the climate of Europe is softened by the ameliorating influence of the broad drift of equatorial water, known as the Gulf Stream: whereas the climate of the Laurentian Highland is chilled by the cold blasts that sweep over the great expanse of snow and ice covering or held among those northern islands; or, by the damp and penetrating winds that sweep across the broad current of icy water drifting southward through Davis Strait, washing the coast of Labrador, and even carrying part of its load of icebergs through Belle Isle Strait and into the Gulf of St. Lawrence. This climatic contrast between similar latitudes in Europe and Canada is the classic example of the overpowering influence of air,—and ocean,—currents over mere latitude; or, to generalise more broadly, of mobility over fixity. An easy inference from these conditions, borne out by the facts, is that generally precipitation over the entire pre-Cambrian area will be light as compared with similar latitudes in Europe. As is to be expected it increases somewhat as the coast and larger lakes are neared. But no vast mountain-wall intervenes, as between southern British Columbia and southern Alberta to increase precipitation on one side and lessen it on the other. Over the pre-Cambrian area as a whole precipitation is remarkably uniform. There is no desert spot due solely to lack of moisture. Nor is there any extended part afflicted with nearly continuous cloudiness and superabundance of moisture. A high percentage of clear sky and sunshine throughout the summer season is the general rule over the entire area that has been explored.

### Geology of the Shield

But the complete climatic picture is not quite so grim and hard as this first rough outline sketch would make it appear. Climate is greatly influenced by elevation as well as by wind water, and latitude. It is a surprising fact that this vast area, though subject to the adverse climatic influences outlined, has probably less permanent snow than is to be found above the snowline within the torrid zone. Light precipitation and remarkably uniform and low average elevation are the explanation. Much of the area sloping to Hudson Bay is less than one thousand feet above sea level and the greater part of the remainder is under two thousand feet. Only one small area is of really mountainous altitude, the Nachvak Mountains of north-eastern Labrador, said by Dr. Coleman to reach the very moderate elevation of six thousand feet. This practical absence of permanent snow and ice, during the present geological epoch, is of great economic importance. It is probable that, but for this condition, very little, if any, of Canada east of the Rocky Mountains could successfully grow either cereals or fruits. In view of this uniformly low elevation, the term Laurentian Highland is somewhat mis-leading, the more

significant geological appellation pre-Cambrian Shield, being preferable.

The science of geology is the most essential key to a proper economic understanding of the pre-Cambrian Shield. Perhaps of no other equivalent area on our planet is this statement equally true. We must therefore by a few bold strokes, try to convey, however inadequately, a broad outline of the most crucial geological facts concerning this great area.

The remarkably and uniformly low elevation of so vast an area; the bare, smoothed and rounded hills of rock, many with striated surfaces, comprising most of the present surface; the myriads of crystal lakes, and the innumerable peat-bogs and muskegs, scattered indiscriminately everywhere; the indefinite complicated drainage, through numberless streamlets, creeks and rivers, tumbling without plan or system over countless rapids, cascades and falls, rushing through narrow gorges and widening unexpectedly into placid lakes, making nearly every part of the great area accessible to the canoe; the erratic morainal blocks and other materials, traceable to this area, found scattered over southern Ontario and the northern United States down to the Ohio River; the thin mantle of boulder clay and other glacial drift materials, left in irregular patches over much of the pre-Cambrian area; the faceted and striated boulders and gravel found in this material: moreover, the vast volume of elastic sedimentary rocks, leaning against the margin of the Shield, forming a large part of the remainder of the continent, and very evidently derived from materials once forming part of this highland; the absence of any clear traces of life in any of the oldest formations remaining in place — these and many other phenomena which are observed by the trained eye of the geologist, are so many symbols inscribed in Nature's scroll. Deciphered, as they have been, by the geologists of our Universities and of our Dominion and Provincial Governments, these symbols reveal a story of entrancing interest, particularly to Canadians. We can make only passing reference to their devoted and brilliant work, which must continue for a very long period of time, in unravelling the geological history, and assisting in the economic interpretation of the geological structures and formations, of this vast area, with the hope that some who have not yet done so may be tempted to look into this pre-historic volume concerning our country.

(To be continued)

### BISMUTH IN 1922

The quantity of bismuth sold in the United States in 1922, according to figures compiled by the United States Geological Survey, was 226,385 pounds, and the average price was \$2.26 a pound. The quantity sold including imported and domestic bismuth that was recovered in refining lead and ten bullion at three plants in the United States. About 300,000 pounds of bismuth was recovered at these plants in each of the last two years. The chief source of the bismuth recovered from tin refined in the United States is Bolivia; the chief sources of that recovered from lead are Mexico and the Western States.

London and New York are the principal centers of the market for bismuth. New York supplies the domestic consumers, most of whom are manufacturers of medicinal chemicals in the vicinity of New York, Philadelphia and St. Louis.



## LETTERS FROM READERS

## Mr Nichols Presents Views of Western Members

To the Editor,  
Canadian Mining Journal  
Sir; —

In the issue of the "Canadian Mining Journal" dated March 23rd, last, I note that you have repeated an interpretation of the proposed amendments to the By-Laws that is not the correct one. I therefore desire to state clearly wherein the error lies, as I feel sure that you would not wish that your paper should misrepresent the views of others.

In writing to you now, I am not expressing my views alone, but those of every one of the signatories to the proposed amendments, and of the many members, not confined to the West, who have endorsed the action that has been taken in their presentation. My statements may therefore be taken as authoritative in regard to what is really intended.

You say "It (the annual meeting of the Institute) was saved, curiously enough, by one of the very members whom our Western confrères would have us exclude... a non-professional member."

The Western members do not wish to exclude, but the object of the amendments is not to exclude, the non-professional man.

I am taking it upon myself to make this definite statement, which I know you will accept as being desirable for that better understanding that we all realize as essential and in which we are all interested, because I can see very well how this misconception grew.

Will you allow me to make one or two remarks in explanation?

You know that during the earlier part of last year there was much controversy about membership policy, and the air was so thick with conflicting issues that, interested as I was, (and I may say that I had been in correspondence with the Secretary upon the subject during the previous year), I waited until things had quieted down a little, and then sought to start though from another angle, from a point back of the field in which the campaign was being fought.

My feeling was, (and I submit this viewpoint now), that this matter of Institute membership is to be considered in three ways;

As a matter of principles, — The worth of an organization depends upon the worth of its members.

As a matter of Policy, — The character of the worth required is to be provided for in regulations.

As a matter of administration, — The regulations are to be carried out.

If you will do me the honor to look through my paper on the "Institute Idea", you will see that then I was discussing and trying to get others to consider, a principle, — I was not dealing with policy and I stressed this point when I introduced the paper at the western General Meeting in November. That point, apparently, was not quite understood and that is why it comes about that the amendments have been interpreted as they have been by you. The consideration of the principles involved was followed by the question of the policy to be adopted, and the recommendations were embodied in the amendments.

*ments, in collaboration with a great number of others, interested in them, was, and is, that the institute membership should not be restricted to professional men, but should be restricted to men of responsibility, or worth, in, and to, the industry. The dominant law, embodying stands, to be balloted on, members shall have been for at least five years in responsible positions with regard to practical mining and Metallurgical Work.*

Not technical positions, not professional positions, not scientific position, — just positions of responsibility.

I want to be perfectly candid. It is my own desire to see an Institute in Canada in which the bond among professional men may obtain a real and operative value. That is the reason why, in my paper on the "Institute Idea", I sought to show wherein that value lay, and to establish the principle.

Then came the question, — In what way, and to what extent can that principle be embodied in the policy of this Institute? This was a question of policy, and those who have indented themselves with the amendments, and those in favor of them, are openly stating that the essential is best served by providing that membership shall be restricted to men of worth, and not only professional men, — all men of worth, genuinely interested in the mining industry, to the extent of subscribing their worth to the building up of a representative body of influence.

As these are the facts, is it more than our due that we should ask you to place this construction clearly before the public in your paper, as an amendment to the previous statements based on misunderstanding.

There is another question, in addition to those of inherent principle and avowed policy, and that is, administration. It is not becoming, perhaps, at this time to discuss this matter; but I may say that the Council has under consideration certain means whereby better representation of opinion may be secured and the better exercise of its functions provided for. Is it not this that is wanted to ensure a democratic organization? Is it supposed that men with no interest, except to say that they are members by virtue of a \$10.00 annual subscription, are going to put thought and work and experience into the Institute such as that now being put in? I say this in no spirit of egotism, and I speak for others.

Vancouver, B. C.

H. G. Nichols

## Temiskaming Testing Laboratory's Rates for Assaying

To the Editor,  
Canadian Mining Journal.  
Sir; —

There is nothing more repellant to me than a public controversy, so it is with the utmost reluctance I write this letter.

In your issue of March 30th, you state, — "It is eminently desirable that the officials of the Department of Mines should have early and accurate knowledge of the development in the gold fields, that they may perform their public services the better. With this end in view the Laboratories at Cobalt have offered very attractive rates to prospectors and others. This would be 'all to the good' were it not for the existence of independent custom assayers, one of the most valu-



able adjuncts to a gold mining camp. It is said that the public laboratory has cut prices to a point that the private laboratory cannot meet..."

In reply Mr. A. A. Cole says in your issue of April 13th, — "In your last paragraph, your adverse criticism of the assaying department is based on false information and calls for correction".

It is my belief, Mr. Editor, that an experience I related to you at the Mining Institute meeting at Montreal prompted this criticism, and I want to state that what I said was not false, but correct to the last detail. So that Mr. Cole may understand your source of information, I will repeat my statement, giving facts and figures.

I opened a mining engineering and custom assaying office here, with an initial outlay of something over \$3000. To a poor man, and one who spent the three most productive years of his life in the C. E. F., this was a venture of some magnitude. The first week I was operating I received a communication from an engineer, asking me what my rate would be on a season's assaying of approximately 300 samples, weighing on an average ten pounds each, and stating that he was sending a similar letter to two other reliable assayers. I quoted him a rate of \$1.00 each, and I believe this to be the lowest rate at which an efficient assayer can do justice to himself. He came back personally and told me my rate seemed to correspond with one of the other offices, but was away high compared with the Temiskaming Testing Laboratories, as they quoted a flat rate of 75 cents each. Two other engineers tell me that they have been offered the same figure, — two of my steady clients, I might add.

I tell these people that it is simply out of the question for me to try to meet this price, and that I believe that no man with his own capital involved can work so cheaply, give good service and continue in business. Also, if I offered that rate to one, it would be my universal rate, because I could have no especially favored clients. Perhaps a Government subsidized laboratory, who can advertise "Owned and operated by the Ontario Government Department of Mines", and whose salaried executive always knows that there is an abundance of ready funds to take care of any financial emergency that might arise, may be able to work this as cheaply as this; but I cannot, and don't intend to try.

The upshot of the whole thing has been, as far as I am concerned, that the first man I mentioned sent about 150 samples to Cobalt, then switched his business over to me, telling me that he believed the better service and quicker returns warranted the additional expenditure. I do not think I lost any business with the other two, except when the power was off at the time of the Haileybury fire.

If Mr. Cole has forgotten the experience I related to you, Mr. Editor, (which does not seem reasonable), I am quite willing to recall the engineer's name and the circumstances to his memory; also to furnish the names of the other two engineers who have told me that they were offered the same rate. These men must, however, be protected from any undue publicity.

Now I have no further interest in this issue. One year's operation has taught me that I can stand the competition of the public laboratory. What has

prompted me to write this letter was the bald statement that your information was false.

Kirkland Lake, Ont.

Frank. H. Huff.

## POSITIONS OPEN IN OTTAWA

Applications for the following three positions will be received by the Civil Service Commission, Ottawa, until the dates mentioned.

5241—Two engineers, Mines Branch, Department of Mines, to commence at a salary of \$2,100 a year with yearly addition of \$120, plus bonus as may be provided by law. One engineer will assist in the Division of Mineral Resources, and the successful applicant's first work will be to examine alkali deposits in the West. Applications for the position will be received up to May 10th.

The second engineer, with similar salary, will assist in the operations of the Division of Ceramics and Road Materials, both in the field and in the laboratory. He must be already experienced in ceramics. Applications will be received up to May 21st.

5242—An assistant in the Mines Branch is to be appointed at an initial salary of \$1,680 with annual increase of \$120 and bonus as provided by law. Field and laboratory work will be included in his duties. Applications will be received up to May 10th.

Candidates are required to be university graduates, or the equivalent, with subsequent practical experience. Application forms can be obtained from Ottawa, from any office of the Employment Service of Canada, or from postmasters in the principal cities

## PROBABLE LIFE OF JOHANNESBURG

Johannesburg, South Africa, is merely a mining town whose seeming permanency is due to the persistence of the gold reefs of the 'Rand and their gold content. This is the gist of some discussion reported recently in the "S. A. Mining and Engineering Journal". The present resources of the working mines are estimated at 300 million tons containing over 6 dwts. per ton in value. In addition there is estimated to be 724 million tons of ore of lower grade, which may become workable if extraction processes are improved or mining methods cheapened. As the ore, is being mined at the rate of 26 million tons a year, an 11½ years' supply of milling grade is assured. It is probable that ore of the second category will be used largely to supplement this supply. As the prosperity of the whole of South Africa, as well as Johannesburg, depends very largely upon the 'Rand's gold production, this question of its duration is very highly important to the Union.

The copper industry in the Katanga province of the Belgian Congo is, next to the 'Rand gold mining, the most important mining operation on the African continent.

The present lack of adequate prospecting in South Africa is causing comment among those interested in the mineral industry. The "lone prospector" has almost ceased to exist, and the great expense of developing a find has proved a deterrent even to syndicated prospecting.



## Opportunities for Prospectors in Portland Canal District

When it is borne in mind that the Premier Mine in 1922 produced nearly as much gold and almost double the amount of silver as was won in the entire province of British Columbia, including the Premier itself, in 1921, it is not surprising that the Portland Canal District, in which this property is situated, is at present one of the outstanding attractions of the entire mining and industrial world.

Since the Premier came into prominence not much more than two years ago there has been mining development, more prospecting, and more road and trail construction in the Salmon River section of this mountainous region in the northwesterly corner of British Columbia than has been crowded into so short a space of time anywhere else in the West for many years.

A parallel might be found in the Cariboo gold rush of the '60's, or in the later mining booms of the Slokan or of Rossland; but in recent years there has been nothing like it on the Pacific side of the prairies. The movement has not yet obtained its full momentum. As has been stated, the success of the Premier Mine is the finest advertisement British Columbia mining has had for years. Its value recently was accentuated by the exceptionally concise and conservative, but none the less wonderfully impressive report of Mr. H. A. Guess, president of the Premier Gold Mining Company. That there is to be more activity this year in the mineral zone of which the town of Stewart is the gateway than ever before, has been forecasted by George Clothier, resident mining engineer, and his prediction has been substantiated by recent events as well as by the accounts of every mining man who has come out of the country during recent months.

### Travel Routes Centre at Stewart

The announcement was made by the Hon. T. D. Pattullo, Minister of Lands, only a short time ago that the government proposed putting several hundred of its lots in the town of Stewart on the market. As a matter of fact this sale has been definitely set for May 14th, which is to say that the provincial authorities are convinced that the time has arrived in the growth of that mining community to give all interested an opportunity of obtaining building sites.

Stewart is the Canadian entrance to the new western Eldorado. From that point one can travel in any direction inland. Motor cars can reach Bitter Creek, a distance of eight miles. For fourteen miles up the Bear River there is a good wagon road, with branch horse trails up the main tributary creeks. The main road is continued as a first-class horse trail up the river over the divide to Meziadin lake, forty miles from tidewater. There is a first-class motor road from Stewart to the Premier Mine. Of this, the first two miles are in British Columbia, connecting with the Salmon River road; at Hyder, Alaska; and continuing for thirteen miles in American territory. The last three miles are on the Canadian side. The provincial government is constructing a branch from this road to the upper valley of the salmon river and serviceable horse trails have been built from the Premier road, one of which

goes over the divide on to the Long Lake side and the other over the divide to the Naas slope following the Missouri ridge. Any point down the Portland Canal can be reached by launch; to Maple Bay is a little over 30 miles; to Georgia river about 15 miles, with a government trail up the river for about 5 miles; to Marmot river is about 4 miles, with a good trail to the heads of both forks. It is clear, therefore, that this mining division has been made very accessible in all parts of the more prospected areas.

### Unuk Basin a Promising Area

It is probable that some prospecting will be done in the Unuk River basin this season. Mr. Clothier has said more than once that, in his opinion, there is good mineral bearing country "east of the granite, about twenty miles from tidewater." At present it is somewhat difficult to get into, but no doubt some hardy and experienced prospectors will be successful. There is a possibility that it will be opened up by trail before long. Mr. Clothier is known to be in favor of this. Upon his recommendation the Provincial Mines Department, in co-operation with the Works Department, has done most of the road and trail construction that has been sketched. He still, however, is far from satisfied. Last year he experimented with the building of cheap "exploration" trails into unprospected mineral areas. Twenty-five miles of such trail was slashed out, down timber cut out, and footbridges thrown across creeks, starting from the Bear-Naas trail north to Surprise Creek and along the east slope of the range. It is probable this policy will be applied in the opening up of the Unuk River basin.

Encouragement to those planning to prospect in the district is found in the fact that it is authoritatively asserted that hitherto prospecting has been confined very largely to showings already discovered and to a more thorough searching of claims already staked. Government statistics show a distinct increase in the number of claims staked last year and the assessments recorded, but this is not accounted for by the opening up of new sections so much as the gradual extension in the known mineral areas. Over 700 claims were recorded in the Portland Canal District last year, 1,200 assessments were done and about 1,000 prospector's certificates issued. These figures will be substantially increased in 1923 if the prophecies of those closest in touch with the situation are borne out and if the reports as to the number of prospectors arranging to go north as soon as the season opens up are well founded.

### Geology of the District

Mr. Clothier divides the district in question into three parts geologically, viz. the Coast Range Belt, in the centre, the Eastern Contact Belt on the eastern flank of the Coast range and the Western Contact Belt of the western flank. The importance of the Eastern Contact Belt has been emphasized by the Premier Mine's output and profits and it is observed that "it is worthy of consideration that where there has been any extensive prospecting and development work along this belt the results have been encouraging. At Kitsumgallum Lake; at the head of Kitsault and Illiance



ivers; at the head of Portland Canal, on the Bear, Salmon and Marmot rivers; and in the Atlin section, in the Engineer mine vicinity, are the only 'spots' where this mineral belt has been explored to any extent. In these isolated places, aggregating probably sixty miles along the belt, there have been developed the Dolly Varden, Premier, and Engineer Mines. There remains a distance of over 300 miles in this district alone, along identically the same belt, in which, as yet, there has never been heard the sound of the Prospector's pick."

### Properties Under Development

As to present conditions, the whole world knows of the Premier Mine, its high-grade ores and large bodies of lower-grade milling ores, its modern plant at the mine, its eleven-mile aerial tramway with first-class bunkering facilities at tidewater, and its production and profits, so that it is unnecessary to do any more recapitulation than thus to recite the facts. But it was not the only property under development last year, nor will it be the only one receiving attention this summer. In the Portland Canal country in 1922 considerable work was done on the Outsider Group at Maple Bay; the Sunshine Group on Glacier Creek; the Mobile and Prince John Groups on the Bear River; the Indian and B. C. Silver Mines; as well as several properties on the Alaskan side of the Salmon River. If the Atlin district is included — and it should be because its minerals are on the same contact and the section is immediately adjacent — work of a serious and promising character was done on the Atlin silver-lead mines, the Engineer Mine received some attention and shipping ore was opened up and some shipments made from the Maid of Erin Group in Rainy Hollow. Several of these properties have exposed large tonnages of ore and may be expected to begin shipping regularly in the near future.

Many prospects were worked last summer but closed down in the winter and among those of this class in the Portland Canal zone were the Patricia and Idaho Groups on the Marmot River; the Silverado Group at Stewart; the Mimico and Evening Sun Groups, Glacier Creek; the George Group, Bear River; the Outland, Betty, Big Missouri, Unicorn and others in the Salmon River Valley. And there were still others on the Alaska side of which good reports are heard. This indicates that exploration work has been the feature of recent activity and it may be expected that the same will continue true this year, although, as has been stated there is no doubt that much more prospecting will take place.

### Three Near-Mines

Naturally there is much speculation as to the possibility of another Premier Mine being developed and on this point it is well to bear in mind that it took fifteen years to bring this property to the position it now occupies. Still, there are a few holdings that have been more intensively explored than others of late and the development of which, because of their promise, will be closely watched this year. One of these is the B. C. Silver Mines, Ltd., a group adjacent to the Premier. This company's success in outting the extension of one of the important ore producing fissures of the Premier and the satisfactory values obtained across a width of 25 feet, has caused much excitement. There is every reason to believe that it will become an important

producer. Large bodies of milling grade ore have been developed on the property of the Indian Mines, Ltd., which is another property worth keeping an eye on. The Big Missouri, turned down after examination by mining authorities, but whose worth has been stoutly upheld by other authorities as well as by practical miners intimately acquainted with local conditions, gives indications of "coming back" and of proving that the most talented of geologists sometimes err. The results of last year's work were encouraging and it is said that further geological data may entirely alter the complexion of things. The work will be continued this year. The development of the Prince John Group on Bear River, of the Dunwell Mines, Glacier Creek, and of the Mobile Group, Bear River, are all operations that are being followed with much interest.

### Granby's Activities

Any attempt to summarize the mining situation in and around Portland Canal would be lacking in one of its essentials if no reference were made to the Granby Consolidated Mining & Smelting Co., which has its smelting centre at Anyox and whose ramifications extends not only throughout the northwestern part of British Columbia, but have again spread to the southern field. This Company is to Alice Arm, the Salmon and Bear River regions, and the adjacent areas, what the Canadian Consolidated Mining & Smelting Co. is to the Kootenays. The positions of the two are analogous in most respects although perhaps the independent operators of the northwest are somewhat more independent, if they care to be or if it is necessary, because the Tacoma Smelter a few hundred miles further to the south can be easily reached by water.

The enterprise of the Granby Company, however, has had, and unquestionably will continue to have, an important bearing on the development of the mineral resources of the district under discussion. Last year they employed in all departments some 1,100 men. From the Hidden Great mines there were mined 854,714 tons of ore, producing 30,334,180 pounds of copper, 386,264 ounces of silver and 8,901 ounces of gold. The coke and by-product plant was in continuous operation and turned out 52,305 tons of coke. The power plant at Anyox is being added to by the construction of a dam, which will be completed this year, and a 1,000-ton concentrator of three units is to be built. That a policy of expansion in the North has been decided upon, and that the Company proposes to increase its reserves well beyond those available at the Hidden Creek Mines, is apparent from the fact that they recently bonded three copper properties in the Portland Canal section, viz., the Outsider, Maple Bay; the Sunshine Group, Glacier Creek; and the George Group, near the head of Bear river. The successful development of the George Group, Mr. Clothier states, would be of special importance to the Stewart district, as it would mean the operation of the Portland Canal Short Line Ry. and its extension to the Bear River pass, where the property is situated, thus giving a further distance of six miles along the Bear River railway facilities and bringing the area beyond the Bear River divide within range of transportation.

In the Mineral Survey District No. 1 last year there were mined 1,065,758 tons of ore, which produced gold, 167,736 ounces, silver 4,684,944 ounces, copper, 31,054,010 pounds; and lead, 14,285 pounds. These are increases in comparison with 1921 in all cases with



the exception of in copper. The gold output is practically double that of last year and is three times that of 1920. The silver represents the greatest production of that precious metal ever made in one year in any one district of the Province. This is due, of course, to the Premier Mine.

Will the Portland Canal District develop other equally phenomenal producers? There are many pros-

pects just as promising as the "wonder mine" was in its earlier stages; some of them are distinctly more encouraging; engineers and practical mining men are a unit in asserting that there is no reason why the Premier's record should not be repeated in this district. Certain it is that earnest prospecting, exploration and development is to proceed this year on a scale never before equalled in this section of British Columbia.

R.D.

## Quebec's Gold Fields to Have a "Grand Opening"

By ALEXANDER GRAY

Dr. H. C. Cooke's article on the economic geology of the Opasatica-Duparquet areas of Quebec, presented in the "Canadian Mining Journal" recently, provides chapter and verse for "Bush Baptists", those intrepid apostles who blaze their way. The blueprints obtainable from Quebec Mines Department (now being run off in editions) attest the aggressiveness of the movement and the active interest of corporations, individuals and syndicates of more or less influence and ability to finance field operations. Two essential preliminaries, therefore, have been provided and Quebec's prospecting season starts under excellent auspices, more impressive, perhaps, than those attending the initial efforts in any other district since Poreupine.

### Gold District is Difficult of Access

Strenuous effort intelligently directed and adequately fortified with cash are pre-requisites to a thorough preliminary examination of the townships staked, and to be staked, for the movement has lost no momentum. Poreupine was none too accessible. Kirkland Lake was alongside a railway. Larder Lake, and now Quebec, will have relief in the near future, via the Temiskaming and Northern Ontario or the Canadian Pacific, as well as the Transcontinental Railway. After all there is a compensating factor in having mining country where its potentials require vigorous treatment "so near and yet so far." Smuts put the matter neatly on one occasion when Boer farmers were complaining of conditions and upbraiding the Transvaal Government for not doing more. The fighting scholar listened patiently to the complainants and then remarked: "Do you know what is the real trouble with you farmers?" A series of replies covered every ill, real or imaginary.

Smuts then had his say: "Your chief trouble is that the ground is too near".

### Substantial Interests Involved

Backbone, the weight of physical forces, bending to the task, was Smuts' remedy. And so it is with Quebec's gold fields. They have attracted certain of the established Cobalt companies; dominant owners in those companies; innumerable capitalists who joined in similar prior movements; and it is understood by all these that the making of gold fields differs radically from the immediate returns obtained from Cobalt's bullion ores. During the Montreal River era it was learned that Cobalt is alone of its kind. The

catalogue of Montreal River companies would make a substantial directory of those identified with North Country mining. Poreupine likewise attracted many, but held a few. History then repeated itself—closer to transportation than the Quebec fields. However, experience was gained, and Quebec is to get the cumulative benefits. Larger field parties, fully equipped, the knowledge gained from contacts and shearings, and the futility of acreage without fractures, will give Quebec a speedier certificate of character. The ground is not so near, its contents will have to be stooped for, and there is the assurance of Dr. Cooke that the Pontiac and Temiskaming Series are identical, the only difference being that the Quebec section "has been much more strongly folded and metamorphosed" and is "more widespread and thicker".

Distance lends enchantment—until there is disenchantment. Enough has been ascertained about the Quebec fields to give them a probationary status. "Sweat" was the Smuts antidote for taciturnity and impecuniosity. The sturdiest of types is the "Bush Baptist", who bathes (when he has to) in the snow and swathes himself in perennial optimism. Given the requisite effort of those now represented on the field, it is to be expected the results will speak for themselves, without prospectuses.

### The Claims Under Development

The Cockeram-Powell-Horne lines in Rouyn township are occupied by responsible organizations. Exactly who has both the Cockeram and Powell veins, as they are designated, cannot be stated with definiteness. The Hammell-Cockeram (cornering on the St. Louis property) is held by a strong syndicate engaged in diamond drilling. What are the values thus far secured from the two cores, to a depth of 100 feet, is a subject for conjecture. Outcropping values were variable, but are said to have averaged satisfactorily.

A series of boreholes will be necessary to determine those values at depth, and along a lateral distance sufficient to make tonnage, as well as to justify the purchase price. Two lines of break provide incentive for the Cockeram holders to pursue their exploration work.

On the south, the Thomson-Chadbourne party (mostly, if not wholly, New York people) have a camp and a prospecting plant in position. Ascertained



values at outcrop convinced Mr. Thomson, a mining engineer of wide experience, that this Powell property had the necessary elements to make a mine. So he associated with himself and Mr. Chadbourne several former technical colleagues and some London principals. Undoubtedly the Powell and Cockeram claims are held by men competent to develop the mines, if there are no underground disappointments.

To the northeast of the Cockeram, the St. Louis ground is held by the syndicate managed by O'Brien and Williams, Montreal stockbrokers, and in which Fred. Connell, Hugh Doheny and others are interested. A camp has been provided and the intention is to locate, if possible, the extension of either the Powell or the Cockeram vein.

Indications are favorable at other points around Lake Osisko. Further south, around Pelletier lake, it is hoped to find correlative conditions. From south of Rouyn lake to and beyond the big bend in the Kinojevis river, there are reports of discoveries on the Davidson, Cavers and other properties. As this section soon will be accessible by water routes from the north and the south, exploration parties will be able to prosecute their work under better conditions, Rouyn township from east to west is occupied.

#### Boischatel Now Staked Throughout

Boischatel township had secondary consideration until the import of Dr. Cooke's study of the situation became known. Now the township is fully staked and more attention is being given to the pioneer properties in the vicinity of Fortune lake, the Lake Fortune Mine and the King of the North, both having geological features more clearly comprehended now than formerly. In or close to the shear zone mentioned by Dr. Cooke, the Lake Fortune and King of the North properties may undergo a revision of judgment, when they are financed and exploration is resumed. Along the shear zone described by Dr. Cooke the country is highly mineralized. Porphyry masses have been noted and quartz outcrops are promising. Not much has been heard from the Township of Dasserat, to the west of Boischatel. It is known that the porphyries extend across the height-of-land into Duprat township.

When the snow blanket is off, Quebec will have mass movement. Cobalt companies did not take Porcupine seriously enough. Individual Cobalt men bestirred themselves and acquired Pearl Lake areas. Apart from the Beaver-Temiskaming, no Cobalt company benefitted from Kirkland Lake. Crown Reserve has great expectations about its Pancake Lake property. The "negatives" of Cobalt, were in the majority in the gold country; but it may be South Lorrain will provide compensation and that Quebec will meet with favor. At any rate, Coniagas has holdings in Rouyn township. It is not apparent that the Mining Corporation will do likewise, as yet. Senator M. J. O'Brien's representatives are understood to have located in central Boischatel. The stage is set and more than scenery should come into view when the snow curtain is raised. But, of course, many of the participants will not have a speaking part.

The output of asbestos in Southern Rhodesia during 1922 was 14,248 tons, while for January, 1923, it was 1,708 tons.

#### ECHOES FROM CONFERENCE ON RESEARCH

The Canadian Manufacturers' Association has just published the proceedings of the conference on research it convened in Ottawa in February last. In it will be found much food for thought by those interested in the industrial progress of the Dominion. One of the outstanding addresses, that of Dr. C. V. Corless, has appeared already in these pages. Following are short extracts from some of the other addresses.

In outlining the Advisory Research Council's work, Dr. Frank D. Adams said:

##### Conditions in Britain

"The British Research Council with the great fund its disposal (£2,000,000) has approached the various industries of Great Britain and has induced some twenty-three of them to organize themselves, and they have established a separate laboratory for the study and solution of their respective industrial problems and for the improvement and cheapening of their manufacturing processes. Each industry has subscribed a large sum of money and the Research Council has added to this an equal sum, and the special research laboratory for each industry has thus been started.

"In Canada conditions are quite different. The industries are fewer and not so wealthy and the Canadian Government is not in a position to subscribe \$10,000,000 in aid of research.

##### The Canadian Scheme

"Research Council of Canada are consequently recommending to the Government a plan for the development of industrial research which is much less costly and which meets Canadian conditions.

"It suggests that the government and the industries of Canada, of whatever kind they may be—manufacturing, mining, metallurgical or agriculture—co-operate and work together in the development of a single national research institute. This may be erected in Ottawa or in one of the great industrial centres of the Dominion as the government may decide. The proposal is that the government as its share will erect and equip a suitable building for the research institute and will provide a certain sum annually for its upkeep and for the salary of a director and two assistant directors—all men of marked ability and experience in research. The industries will then when they have any problem to solve, come to the institute and submitting it to the director, will be provided with a laboratory space and full facilities for carrying out the required work. The director will secure for them a properly qualified man to carry out the investigation under his direction, whose salary and the expenses entailed (apart from overhead charges) will be borne by the industry or firm for whom the work is being done.

##### The Mellon Institute

"Many most remarkable and brilliant discoveries saving hundreds of thousands of dollars, and effecting immense improvement in the whole range of industries in the United States have been made by investigations of this kind and carried out on exactly this plan at the Mellon Institute at Pittsburgh. Even such a primitive industry as bread making, while having been known and practised ever since mankind emerged from their



most primitive and savage state—and about which we might be supposed to know everything that could be known—has been subject to several distinct improvements through investigations carried out and discoveries made at the Institute for the Bakers' Association of the United States. The history of the work of the Mellon Institute is so striking that it reads like a veritable romance.

These advantages should be placed at the disposal of the manufacturers of Canada if they are to be placed in a position to meet their competitors in other countries as the rivalry in trade becomes more intense, and it is believed that all these would be provided for them by the establishment of a national research institute.

### Will Canada Remain Last in the Race?

Col. F. M. Gaudet, formerly Technical Executive Officer of the Advisory Research Council, and himself well experienced in practical benefits of industrial research, concludes his remarks thus: "What are we doing in Canada today? What are we doing to help our industries and manufacturers? We are doing nothing. . . . Some of our rich corporations are doing little, but what we want is the establishment of a research institute that will be a guide in all these matters. We want to focus our efforts and our energies in such a way that we shall get the best results."

Mr. Hume Cronyn, formerly chairman of the parliamentary committee on research, outlined the past and present effort in respect of research by the leading industrial nations of the world. Britain has made wonderful strides since she awoke to the peril of her position in 1915. The United States is far in the lead. Canada is woefully behind. Mr. Cronyn concludes by saying: "Are these other nations, who are making large expenditures on scientific research, chasing a will-o'-the-wisp? Can this idea be a mere fad or dream? As Dr. Ruttan has pointed out, we are the only British Dominion that has not actively taken steps towards the establishment of a national research institute. Are all the others out of step? Is Canada alone marching forward?"

### ARSENIC OUTLOOK IMPROVING

The output of new refined and crude arsenic in the United States in 1922, all of which was sold, amounted to 9,350 short tons, according to final reports received from producers by the United States Geological Survey. Additional sales from stocks brought the total quantity marketed to 10,027 tons, valued at \$1,475,229. The sales of crude arsenic, 70 to 94.8 per cent pure, amounted to 1,122 tons, and the average selling price was 6.2 cents a pound at the plants. Most of this material was converted at the places of production into sodium arsenite for killing weeds, and small lots of it were exported for agricultural use. The sales of white or refined arsenic, 99.5 per cent pure, amounted to 8,905 short tons, and the average selling price was 7.5 cents a pound f.o.b. refinery.

The imports of white arsenic, according to the Bureau of Foreign and Domestic Commerce, amounted to 210 tons up to September 21, 1922, when the new tariff law became effective. During the rest of the year, ac-

cording to reports from brokers, 307 tons were imported, which brings the total supply of white arsenic for the year up to about 10,600 tons.

The minimum possible demand for white arsenic in 1923 was placed last December at 12,000 tons, but the demand now expected will be much greater. For example, the minimum demand included only 3,500 tons to be made into calcium arsenate, where as the demand may be 7,200 tons. As already shown by B. R. Coad, of the Bureau of Entomology, Department of Agriculture, as much as 25,000,000 pounds of calcium arsenate, equivalent to about 5,600 tons of white arsenic, may be available for use as insecticide during the season of 1923, so that there will probably be some shortage of calcium arsenate, though it will not be so great as was at first expected.

The estimated production in 1923, based on operations in the first quarter, is placed at 22,000 tons of refined white arsenic and 5,000 tons of crude white arsenic. The imports from Mexico may amount to 5,000 tons, and those from other countries will probably raise the total to 35,000 tons. This estimate does not include the possible output of several small operators who may further increase the domestic output before the end of the year. It appears, therefore, that as soon as the spring demand from manufacturers of insecticides declines the supply of white arsenic will be sufficient to supply all needs.

Owing to the high prices quoted for white arsenic in 1922, buyers in New York reported that they had received offers in December from several foreign sources. One thousand tons annually was promised from Greece and current supplies were offered from Australia, Belgium, Germany, and France. The belief has been expressed that with increased production at home and abroad the potential supplies for 1924 are increasing rapidly, and that after consumption begins to decline, next August, there may be a rather serious though temporary break in the market after which the price of white arsenic may become established at 8 to 10 cents a pound.

A stable price of 8 cents or more a pound and continued growth of demand may encourage the enlargement of active by-product white arsenic plants and the establishment of new plants at certain of the greater smelters. Direct production cannot furnish cheap arsenic but the establishment at favorable points of plants for the recovery of arsenic and the reshipment of the residues to smelters for recovery of precious and base metals may be advantageous to the miner, the smelter, and the consumer. Arsenic sulphide ore and concentrates require but little fuel, and their roasted residues can be smelted more cheaply than the original ores or concentrates. The success of such an arsenic plant necessarily depends upon a continued steady or increasing demand for domestic arsenic.

According to the Chinese Ministry of Agriculture and Commerce, the total coal production in China for 1922 amounted to about 21,300,000 tons, of which 5,500,000 tons were produced by Chinese mine-owners. This figure has doubled that of 1916, when the Chinese coal owners claimed a production of only 2,800,000 tons out of a total output of 16,000,000 tons estimated for the whole of China.



## PHOSPHATE ON NAURU AND OCEAN ISLAND

While Florida holds the record as a producer of phosphate rock, with 3,255,720 tons in 1920, and with scores of million tons of reserves determined, and while Morocco is now known to possess vast beds of phosphate, far inland, there is a British possession on the opposite side of the globe whose importance ranks with either. Nauru and Ocean Island, tiny specks in the Pacific a few miles south of the equator, 2,200 miles northeast of Sydney, Australia, and directly north of New Ireland, are now being actively worked for phosphate, recent shipments having exceeded 300,000 tons a year. They are 165 miles apart, and each is the tip of a high submarine mountain, the Pacific being very deep in the immediate vicinity. A comprehensive description of the islands is given in recent numbers of "Industrial Australian and Mining Standard." Nauru has an area of 12 square miles and it has been estimated that six-sevenths of this is phosphate-bearing. The rock is mined by hand in open-cuts and drawn on a light railway to a rotary drier, whence it is trammed to storage heaps or to a pier for loading. The island is encircled by a coral reef, on which is built a steel cantilever that discharges the phosphate into small lighters. These lighters are discharged by winches on the cargo steamer anchored a few hundred yards farther out. A longer cantilever, by means of which ships can be loaded direct from the shore, is to be installed. Most of the phosphate is shipped to Australia, and a smaller part to New Zealand and Britain.

Ocean Island is about one-third the size of Nauru, but its phosphate rock is phenomenally rich. It is worked in a similar way.

The temperature on these islands is equable, varying from 85 to 90 deg. F. throughout the year. Heavy rains prevail from November to February. On the island of Nauru there is a fresh-water lagoon, and the fertile soil supports an indigenous population of about 1,200—fine, sturdy people of a negroid type who have a tribal system of government. On Ocean Island there is no lagoon, the native population of 500 having had to subsist on rain water, collected in pools and in caves, until the advent of the phosphate miners. To supplement the supply of native labour, New Guinea "boys" have been brought in recently.

The phosphate deposits of these two islands were mined formerly by a private company. They are now operated by a commission appointed by the British, Australian and New Zealand governments, who bought out the rights of the private owners in 1919. Australia is getting at present the major part of the phosphate rock, and the government intends to reel it at the lowest possible rate. The price has been, until recently, 75s to 80s a ton. At present the price varies from 55s. 6d. per ton in the eastern states of Australia to 58s. 6d. in the more distant western states. It is expected that these prices will be materially reduced in the near future. It may be noted, in comparison, that Florida phosphate is now worth between \$6.00 and \$7.00 at the quarries.

The output of cement in the United States during 1922 was 114,789,984 barrels, valued at \$1.76 a barrel, which is 16 per cent above the output of 1921, and is the largest on record.

## ALUMINUM CHEMICALS IN 1922

In 1922, 281,480 short tons of aluminum salts valued at \$8,813,000, was produced from bauxite and aluminous clays according to figures compiled by the United States Geological Survey. These figures compare with a production of 184,820 short tons in 1921, having a value of \$7,546,000. In 1922 there was consumed in the manufacture of aluminum salts 162,980 tons of bauxite, valued at \$2,305,000, and 11,428 tons of high-alumina clay, valued at \$114,280, as compared with 64,380 tons of bauxite and 9,830 tons of high-alumina clay in 1921. The value of the new aluminum (metal) produced in 1922, was \$13,622,000, and increase of about 25 per cent over the value in 1921.

In 1922 six companies produced 8,305 short tons of ammonium alum, valued at \$535,760, and three companies produced 9,506 short tons of sodium alum valued at \$570,370. Some potash alum was also produced.

Alumina in both hydrated and calcined form was produced by two companies and was used largely in the manufacture of other aluminum salts, particularly iron-free aluminum sulphate.

Five companies reported a production in 1922 of 4,039 short tons of aluminum chloride, valued at \$289,500, as compared with a production in 1921 of 5,650 short tons, valued at \$552,300.

Commercial aluminum sulphate was made at 19 industrial plants and 9 municipal waterworks in 1922, as compared with 19 industrial plants and 5 municipal waterworks in 1921. The aluminum sulphate sold in 1922 amounted to 231,390 short tons, valued at \$6,090,170, as compared with 154,920 tons in 1921, valued at \$5,525,100. Municipal water-purification plants reported the manufacture and use of 6,075 short tons of "Hoover" alum, valued at \$126,095, in 1922, as compared with 3,060 short tons, valued at \$53,839, in 1921.

Iron-free aluminum sulphate was made at 7 plants in 1922, the total production being 19,160 short tons, valued at \$968,650, as compared with 11,000 short tons, valued at \$592,100 in 1921.

The imports of alum cake from January 1 to September 21, 1922, inclusive, were 2,033 short tons, valued at \$80,763. During the same period 135 short tons of alumina, valued at \$8,749, was imported. The exports of alumina (bauxite and other aluminum ores) in 1922 amounted to 19,617 long tons, valued at \$961,208.

The average prices of aluminum salts in 1921 and 1922, as reported to the Geological Survey by manufacturers, are given in the table below.

| Salts                | Average price per short ton. |      |
|----------------------|------------------------------|------|
|                      | 1921                         | 1922 |
| Alum:                |                              |      |
| Ammonia . . . . .    | \$69                         | \$64 |
| Potash . . . . .     | 1.103                        | 70   |
| Sodium . . . . .     | 49                           | 70   |
| Alumina:             |                              |      |
| Calcined . . . . .   | 114                          | 115  |
| Hydrated . . . . .   | 119                          | 76   |
| Chloride . . . . .   | 98                           | 71   |
| Aluminum Sulphate:   |                              |      |
| Commercial . . . . . | 36                           | 26   |
| Iron-free . . . . .  | 54                           | 50   |

A number of mines at Broken Hill, Australia, are preparing to resume operations.



# The Mining Districts

BY THE JOURNAL'S CORRESPONDENTS

## NORTHERN ONTARIO

**Power for Hollinger.** — It has at last been officially announced that the Hollinger has obtained the rights from the Ontario Government to the Long Sault power on the Abitibi River, with permission to develop 25,000 h.p. The Province retains rights on any surplus power the mining company develops. It has been reported a number of times that negotiations for the power had been concluded, but these announcements were premature. The mining company will, of course, be influenced in its programme of development by the result of the action now being tried in the Ontario courts. This action is the case of the Northern Canada Power Company against the Hollinger to determine if the Hollinger agreed to sign contracts for all its power requirements. If the Northern Canada Power Company is successful in its contention it is difficult to see what the mining company could do with the power development.

**Break-up Ends Acute Power Shortage.** — Warm weather during the past few days has entirely changed the power situation in the Porcupine district, and the mines will now be able to obtain all the power they require. The spring has been very late and this has necessitated cut after cut in the supply of power until a few days ago the mines were receiving only a very small fraction of their normal requirements. Plenty of power will also no doubt, have an effect on the labor situation, because a large number of men have had to be laid off and this breeds dissatisfaction, which culminated in a demand for higher wages. With plenty of work for everybody there is less likelihood of trouble, and it is understood that the radical element throughout the camp is not meeting with the support it had anticipated. It is quite probable that wages may be raised, but not to the extent the Union has demanded.

**South Lorrain.** — During the month of March the Lorrain Operating Company, which is the Mining Corporation's subsidiary for the development of the Frontier property in South Lorrain, produced 184,817 ounces. This production puts the Lorrain property among the largest silver producers in Canada. The company reports that stoping operations were continued on the Woods vein, and that satisfactory progress was being made in development and exploration work. Encouraged by the success of the Mining Corporation and the Keeley, several new companies have been formed, some of which have placed their shares on the market. Among these is the Caribou Lorrain Silver Mines, with a capital of \$2,000,000. Arrangements have been made for financing the company, and it is proposed to start active development early in the summer. Brokers are giving a good deal of publicity to Lorrain Consolidated, which has properties adjoining the Keeley and the Mining Corporation. Close proximity to producing mines, however, does not necessarily mean that these claims will be producers themselves.

**Cobalt.** — It is proposed to re-open the Cobalt A-53 property in Gillies Limit and to let a contract for

drifting on the 100-foot level. This property has a considerable area of conglomerate, in which small veins have been found. While development work to date has not shown anything of much value, the property is considered a rather promising prospect.

**Larder.** — A new vein has been found on the 375-foot level of the Associated Gold Fields at Larder Lake, which is about 20 feet away from the main vein and has a width of 7 feet. No assays have yet been reported, but the vein is understood to look quite promising.

**Kirkland.** — The Grenfell Kirkland Gold Mines Limited, with a capital of 2,000,000 shares of \$1.00 par, of which 1,500,000 shares remain in the treasury, has been formed to take over the Stitt claims in Grenfell township. Sufficient funds have been arranged for to start work on the property, and it is proposed to unwater the shaft and do some drifting at the 100-foot level. The property has been known for several years and has small veins in which some good ore has been found.

The Kirkland Gold, which is controlled by the Beaver, is meeting with the best success the company has had since it started, and it is understood that during the month of March profits were in the neighborhood of \$10,000. A new vein has been discovered which is being developed on the 700-and 800-foot levels. The ore lies mostly in the contact between the lamprophyre and the porphyry, but in places lies wholly within the lamprophyre and gives good values in that formation, which is a very unusual thing in the Kirkland Lake district.

Several small developments are under way throughout the Kirkland district, which will result in a good deal of activity during the coming season. The Osweka Gold Mines proposes to commence exploration work as soon as possible. The company owns 160 acres in the immediate vicinity of properties recently taken over by the Tonopah Mining Company of Nevada. The Blanche River Kirkland Gold Mines, Limited, with a capital of \$3,000,000 in one-dollar shares, has been formed to take over and explore claims lying between Swastika and Kenogami Lake. The Vindicator Mines, adjoining the Wright Hargreaves, plans to start work in May and will do surface trenching and diamond drilling. The Rose Gold and Silver Mines, Limited, has been formed to take over properties in the vicinity of the Crown Reserve claims, and funds are being raised for diamond-drilling and shaft-sinking. The Highlands Kirkland will let a contract to sink its shaft from 50 to 100 feet in depth, and to explore a vein that was cut by diamond-drill. It is understood that additional diamond-drilling will be undertaken as well. A Peterborough syndicate is financing work on the Bruce claims, northeast of the Crown Reserve property.

**Nickel Company Resumes Operations.** — It is announced that Norwegian interests have financed the British America Nickel Corporation to the extent of \$1,500,000 and that operations are to be resumed at their plants immediately. Approximately 700 men will



be employed at the mines and smelter in Sudbury and about 300 at the refinery near Ottawa. The plants of this corporation have been closed down for several years, but now the company is understood to have obtained long-term contracts with large American steel producers.

**Gold Ore at Cobalt from Schreiber.** — A twenty-ton shipment of ore from the Foster claims near Schreiber has arrived in Cobalt, and is being sampled by the Temiskaming Testing Laboratories. This ore is being shipped under the provision whereby the Government will purchase ores from prospectors in an effort to stimulate development by means of giving accurate information regarding values.

**Porcupine.** — A contract has been let for diamond-drilling the Porcupine-Keora, and several holes will be put down on the south end of the property.

### ALBERTA

**Coal Output Increasing** — The production of coal in the Province of Alberta is showing an increase. Last January 245,300 tons more were mined than in the same month last year. The total output for January 1923 was 845,806 tons which amount is made up of 347,673 tons of what is classified as domestic, 74,457 sub-bituminous and 423,676 of bituminous. In January 1922 there were produced 312,871 tons of domestic, 30,989 sub-bituminous, 246,788 bituminous and 9,758 anthracite. In January 1922 some 829 tons of domestic were shipped to Ontario while in January of this year the export to that eastern Province totalled 5,239 tons. Shipments to adjacent provinces also are growing so that it is clear that the campaign being carried on by the Alberta Collieries, assisted by the authorities of the Provincial and Federal Governments, already is bringing results.

### BRITISH COLUMBIA

**Natural Gas on Thompson River** — At several points along the Thompson River and Kamloops Lake there are outbursts of gas to which attention has been directed recently. Skaters have been in the habit of lighting them in the winter in order to illuminate the ice. An analysis of samples shows it to be natural gas. It is to be found at widely separated places. Various suggestions have been made for the use of this gas. One is that it is made the motive power of an irrigation system for the reclamation of an immense waste district. It is also suggested that there may be oil in the same locality and that the possibility of coal being found is good. That some drilling should be done for the purpose of determining the district's resources, is the general opinion and it is likely that action along these lines will be taken by some of those who have become interested.

**Advice to Prospectors** — J. D. Galloway, resident mining engineer at Hazelton B. C., recently addressed a gathering of prospectors at Usk, a town on the G. T. P. Ry., in which he recommended caution in the sampling of one's own prospect "as it was only human nature for a prospector to be partial and not to pick his sample in conformity with his outcrop, thus deluding himself into putting in work that could better be expended on other veins." It appeared to the speaker that there could be a better understanding between the prospector and the capitalist. The latter

should have the opportunity to develop a sufficiently explored prospect of merit on a long term lease and bond, with a provision for royalty on shipments to apply on purchase price. This would give capital a chance to prove the prospect in from one to four years and, if good, payment could be made and both would be winners. The prospector was advised not to leave his ore and go into expensive crosscuts until after it had been proved on the surface. In many outcrops of minerals in well-defined veins there is a parallelism of veins in a well-defined zone. Many such cases were known in the north country and the miner should prospect along the strike of the veins where richer ore-shoots may be found or extensions of the same ore-shoot. The lowering of freight rates, making it possible to ship ore to the Granby Smelter from Hazelton at \$8 a ton, including treatment charges, opened up possibilities to properties in the Usk district that hitherto have been unable to stand the expense of shipping.

**Smithers** — A. C. Garde, of Prince Rupert, has bonded the Reco Aspen Group of mineral claims, Hudson Bay Mountain, and development will start when the season opens. A cross-cut tunnel will be driven to tap one of the promising showings exposed. The property consists of eight claims and the values are in silver and lead.

**New Granby Concentrator** — The new 1,500-ton concentrator to be installed at Anyox by the Granby Consolidated Mining & Smelting Co. is to be built by company labor and work will commence as soon as the material needed can be assembled. It is expected to be ready for use about February 1, 1924.

**Kamloops** — The Windpass Mining Co., Kamloops District, which is being financed by Messrs. Wood, Trites and Wilson, of Fernie, all of whom are interested in the Premier Mine, has purchased for cash six claims adjoining the group under development.

**Dividend on Silversmith** — The Silversmith Mines Ltd. of Sardon has declared a dividend of 1 cent a share on a par value of 25 cents, which brings the total of the dividends paid by this property to \$150,000. In January, 1921, \$25,000 was paid and in 1922 there was a distribution of \$100,000.

**Trail Ore Receipts** — Ore receipts at the Trail Smelter, Consolidated Mining & Smelting Co. of Canada for the week March 22 to 31 last, totalled 14,001 tons. This makes the receipts for the first quarter of the year 115,925 tons, a considerable gain over the same period of 1922.

Two old shippers are again on the list, namely, the Emerald, a silver-lead property of the Sheep Creek Camp, and the Van Roi, of Silverton. The company's mines have contributed thus far 100,819 tons, most of which has come from the Sullivan Mine.

Following are the details:

| Company                  | Tons  |
|--------------------------|-------|
| Black Rock, Northport    | 81    |
| Company Mines            | 12402 |
| Emerald, Salmo           | 30    |
| Henderson Gp., Smithers  | 50    |
| Knob Hill, Republic, Wn. | 355   |
| Lone Pine, Republic, Wn. | 331   |
| Paradise, Invermere      | 44    |
| Silverhoard, Ainsworth   | 42    |



|                         |         |
|-------------------------|---------|
| Silversmith, Sandon     | 370     |
| Standard, Silvertown    | 32      |
| Surprise, Republic, Wn. | 216     |
| Van Riel, Silvertown    | 47      |
|                         | 14,001. |

**New Seam of Domestic Coal** — The Canadian Collieries (D) Ltd. is doing some diamond drilling near the No. 5 Mine, Cumberland, and a new seam has been struck which, it is said, promises to develop into the best coal for domestic use in the Comax Field of Vancouver Island. This seam will be worked from the No. 5 shaft, which is being driven through rock in order to escape the heavy expense of a new pit-head.

The coal production of British Columbia for the month of March totalled 248,578.09 tons, made up as follows:

|                           |         |
|---------------------------|---------|
|                           | tons    |
| Vancouver Island District | 147,177 |
| Nicola-Princeton District | 21,901  |
| Crow's Nest Pass District | 79,509  |
| Total                     | 248,587 |

**New Rescue Apparatus** — "The Self Rescuer" is the latest production of American scientists for the protection of the lives of coal miners. Its efficiency and its general value for the purposes it is designed to serve are to be thoroughly investigated by the officials of the mines inspection branch of the Mines Department of this province. If it is found that the appliance will protect the lives of underground workers when caught in a foul atmosphere following an explosion, immediate steps will be taken to have the collieries of British Columbia obtain the equipment.

The new instrument consists only of a small tin can, to which is attached a nose clip and a mouthpiece. It weighs little over a pound, is easily disposed of on the person, and can be very quickly brought into use, it is said. It is claimed that it affords absolute protection to the wearer in the atmosphere to sustain life and that it will last for seventy minutes.

**Offences Against Coal Mine Regulations** — As an evidence of his determination that the terms of the "Coal Mines Regulation Act" shall be enforced, Hon. Wm. Sloan, Minister of Mines, has ordered a special inquiry into two recent infractions of the Act. Wm. Wall, of Nanaimo has been appointed under Section 48 of the Act to initiate inquiries into the cases of Thos. Cunliffe, shiftboss in No. 4 Mine, Cumberland, Canadian Collieries (D) Ltd., who has been fined \$10 for firing shots underground without previously examining the working places to ascertain whether or not inflammable or explosive gas was present; and that of Louis Hadevis, coal miner employed at the Nanoose Collieries, Nanoose Wellington Coal Co., who is charged with smoking while at work underground. The breach of the law which Cunliffe was convicted took place on the 28th of February last, about three weeks after the disastrous explosion in No. 4 Mine. He holds second and third class certificates of competency under Coal Mines Regulation Act. Brought before Magistrate Baird at Cumberland he was convicted on his own admission. The case against Hadevis has not yet been brought before the courts. It is stated that he had been suspected by mine officials

for some time of smoking in the mine and was closely watched. As a result it is alleged that the manager caught him with a pipe still warm in his possession. It is asserted that Hadevis appears to have been in the habit of smoking when the Fireboss was firing shots, in the belief that the smoke of the same would carry off the tobacco fumes without them being noticed.

## NOVA SCOTIA

**The Labour Situation.** — The early return of D. H. MacDougall, vice-president of the British Empire Steel Corporation, from Britain and Germany, where he had gone in connection with the affairs of the Company, has brought a feeling of relief in the province, and it is generally believed that labor differences will now be promptly attended to and not permitted to reach the acute stage. The state of uncertainty that has existed for some time is changing for the better, and if the district is not forced into a U. M. W. election by the international executive, better conditions may prevail during the rest of the year. Should an election be forced, the stage is already set for issues that may not be settled without serious trouble. The law of self-preservation is very dear to the executive of District No. 26, and nothing will be permitted to stand in the way of a return to office of these men. With vice-president MacDougall close by, the coal and steel industries should be able to weather any dispute that may arise from this or any other cause.

**A. S. McNeil's Visit to Europe.** — Mr. A. S. McNeil, General Superintendent of the Dominion Coal Company, Glace Bay, has returned from a visit to the British and Belgian coal mines. Mr. McNeil was greatly interested in the methods of mining carried on in the English and Scottish coal mines. He inspected over twenty collieries, and went into the workings to get first-hand information. He speaks very highly of the courtesy and kindness of the mine officials he met. He was given every opportunity to see and to know what was going on in and around the collieries visited.

The longwall system of mining especially interested Mr. McNeil, and so far as he could in the short time at his disposal, he studied the different phases of this method, which is almost universal in British coal mining. He marvelled at the complete control of the pressure of superincumbent strata. It matters little whether this pressure is exerted on a rock roof of strong limestone, or one of softer material such as shale or soapstone. When a break is necessary to lighten the overhead burden and save the longwall faces, it is brought about with a certainty and regularity that only long years of experience and training on the part of the mine officials and miners could effect. The building of longwall packs in the proper places with the right kind of material (wood or stone); the drawing of all timber from the gobs or waste workings so that a good fall would take place; — all is part of the method, and is carefully carried out. Superintendent McNeil was fortunate enough to see a section of the longwall face where the packs and gob timber had been left in against instructions, to the detriment of the system. The roof rock was falling in, right up to the face. It made a noise like heavy thunder as it broke its way down. Crawling up in a low space on hands and knees after the official in the lead, he had a most uncomfortable feeling. Such cases of neglect are



rare, but when they do occur those responsible are usually dealt with in a summary manner. In several of the mines he entered there were seams very much like some of the Cape Breton coal seams now being worked. The overlying strata and the thickness of the seams were much the same. The method of mining, however, was entirely different. But whether the method of longwall mining can be applied to the Cape Breton seams is as yet problematical.

To change the method of mining requires specially trained workmen, and these are not to be found in Nova Scotia. Any change to be made must come very gradually. It is easier to change the method, if the structure of the strata permits, than to change the miner, and without this there would be absolute failure.

One of the interesting features seen by Mr. McNeil was that of the use of steel props. These were used in a mine with a large daily output, and yet such was the skill of the miner in drawing them, that scarcely one dozen props were lost in a whole month. When we consider that over two thousand props are put into one of our large mines each day, we can understand the difference in the cost of roof support.

Another feature of interest was the longwall conveyor and loader. Those who have knowledge of the longwall system know that in thin seams the mine car cannot be taken along the face, and all coal must be shovelled first to the road head and there filled into the mine car. This entails a lot of extra shovelling, and causes much breakage of coal, and of course reduces the output per man. The work is laborious and distasteful to handpick miners. The mine conveyor has done away with this heavy work, and is in almost general use. Here and there a mine manager may be found sticking to the old system, preferring to "bear the ills he has than fly to those he knows not of"; but such officials are few and far between. The conveyor plays a large part in the loading of coal in the mines of Britain and the Continent.

It took upwards of ten years to introduce these labor — and coal — saving machines. If they did nothing more than save the large cost entailed in brushing each separate roadway they did very much; but they also made coal mining easier and greatly reduced the amount of fine sizes of coal sent out of the mines, and reduced the cost of mining. The conveyor is established, however, in the British mines, and we are quite safe in making the statement that should they be taken out of the mines, the miners would cease to work until they were put back.

The housing conditions were also studied, and while Supt. McNeil saw many fine colliery villages, in some respects excelling those of Nova Scotia, he saw many others that were not up to our standards. To show how British miners live, Mr. McNeil was treated to a very nice supper in a miner's house. The house was picked out at random and the family were just sitting down to supper when, in his own pleasing manner, Mr. McNeil asked permission to join them. The food was excellent — "hamely fare", Burns would say. The table was clean and so was the house and all that was in it, and the supper was very much enjoyed.

Having met the British miner at his work underground, as well as in his home, Mr. McNeil has a

deepened respect for him and well understands how, when he comes to this country, he misses the social life of his native land, which fills a want no new country like Canada can supply. For the British coal mine official he has developed warm feelings and great admiration.

**Labor Politics in Halifax Assembly.** — "Every Deputy Inspector shall be elected each two-year period by the employees working below ground in the jurisdiction over which he shall have supervision." This amendment to the Mines Regulation Act of Nova Scotia was the subject of discussion in the local Assembly a few days ago. Knowing that their case was weak and required bolstering, the Labor members, who sponsored the Bill, contended that all Deputy Inspectors of coal mines should be holders of the Mine Manager's Certificate. This, on the face of it, does not seem unreasonable, but when the same men in the same breath advocated the appointment of Mine Inspectors to such responsible positions by popular ballot all confidence in the sincerity of their plea was destroyed. When special reference was made to an inspector in the Glace Bay district who, while without a certificate, is nevertheless, a man of known ability and high moral character, the whole motive was disclosed. Premier Armstrong, referring to this inspector, stated that he was one of the best Deputy Inspectors in the Province. This ended the debate, and no doubt proclaimed the demise of the Bill.

**The Late Alexander Dick.** — The news of the sudden death of Alexander Dick, General Manager of the Coal Sales Dept., British Empire Steel Corporation, came with a great shock to his many friends in Nova Scotia. Like many another Nova Scotian, Mr. Dick had worked his way up from humble beginnings. He was for a time in the colliery office at Springhill. From there he went to River Hebert as manager of a coal mine. Afterwards, he went to the Canadian West in quest of a more precious mineral than coal. When Cornelius Shields became general manager of the Dominion Coal Company, Mr. Dick came in with him as general sales agent. He was most successful in business, and during his time there was a rapid expansion in the coal industry of the province. He was of a genial, happy temperament. He made friends with everybody, but never forgot the old ones. This was equally true among the mining population as on others of more lofty social position. The writer first knew him in Springhill, when he had just passed the age of twenty. At that time he attended the night school of "Jake" Johnston of life insurance fame. After school hours, a large part of the evening was filled in by listening to the stories of the teacher. "Sandy" (for that was the familiar name by which he was then known) became a very apt pupil in this art, and when in congenial company, his stories, told in his own winsome way, reached both the heart and the intellect. He was, indeed, very pleasant to meet, and possibly after all this shedding of warm sunshine everywhere he went was not the least of Mr. Dick's attainments. At such a time as this the loss to his beloved province and to the coal industry of such an able official is great indeed.

Mr. Dick was twice married, his first wife being Margaret Hall, eldest daughter of the late William Hall, ex-manager of Springhill colliery, and his second wife, Nellie Doyle, daughter of Joseph Doyle, Dublin, Ireland.



### RESEARCH ON COAL

A study of the desulphurization of coke by steam is one of the four important problems undertaken this year at Carnegie Institute of Technology, in co-operation with the U. S. Bureau of Mines. Each of the problems was suggested by an Advisory Committee of coal-mine operators and engineers. The research work is a continuation of the co-operative plan inaugurated last year by the Advisory Board, the Bureau of Mines, and Carnegie Tech. The other investigations being conducted are the correlation of coal beds of Western Pennsylvania through their microscopic constituents, with the Pittsburgh Bed as the basis of study; a fundamental research on the corrosion of alloys in various media; and a study of low-temperature tars from typical Pennsylvania coals, with the Pittsburgh Bed as the basis of study. As was the case in connection with the investigations conducted during the preceding year, Carnegie Tech. will publish the results of the studies soon after completion an announcement.

### DESULPHURIZATION OF COKE BY STEAM

In the course of laboratory experiments in the desulphurization of coke by steam, being conducted at the Pittsburgh Pa., experiment station of the Bureau of Mines, steam tests at atmospheric pressure for the removal of sulphur from chunk size coke have been finished, with encouraging results. Combined sulphur as FeS, FeSO<sub>4</sub>, and free sulphur (not including solid solution sulphur) in Ohio coke was reduced from 1.38 to 72%. The solid solution sulphur was not affected, but it has been shown that this has very little effect in contaminating sponge iron in the blast furnace. In Illinois coke, .62% sulphur corresponding was reduced to .48. Clairton coke low in sulphur was reduced from .29 to .17%. Sulphur in a sample of gas-house coke from Philadelphia was reduced from .81% to .60. These results were obtained without application of vacuum which may reduce still further the amount of sulphur. Very little steam is required - three grams of steam per gram of coke per hour were employed, which is a big excess. Iron will be heated in contact with the treated coke and the transfer of sulphur determined.

### HYDROPLANES FOR FOREST PATROL

The Canadian Department of National Defence has placed an order with the Canadian Vickers here for six hydroplanes. These, it is understood, are mainly to be used in forest patrol and fire prevention work. The planes will be manufactured in Montreal.

**CHEMIST** — Some assaying and practical mining experience, also thorough business training, desires position Mine-mill or Smelter. Adaptable; efficient good health. Reply; Box 573, Canadian Mining Journal, Gardenvale, Que.



### PURCHASE OF GOLD ORES

The attention of prospectors and others is drawn to the provision in the Mining Act of Ontario authorizing the Department of Mines to purchase parcels of gold ore taken out by prospectors and others in developing or working mining claims. Arrangements have been made by which such parcels of gold ore, whether large or small, will be accepted by the Temiskaming Testing Laboratories at Cobalt, and paid for according to the schedule provided for the purpose. The Laboratories are operated under the auspices of the Department of Mines.

This offers a first class opportunity for testing the value of ores on a large scale, and also of turning ore of good quality into money for carrying on further development work. By special arrangements, on less than carload lots, freight rates on the T. & N. O. Railway are reduced 50 per cent.

The Laboratories are also equipped for working out the best methods of treatment for gold or silver ores of a refractory or unusual character.

Full information as to treatment charges, schedule of payments, etc., can be obtained from the undersigned, or from A. A. Cole, Manager, Temiskaming Testing Laboratories, Cobalt, Ontario.

**THOS. W. GIBSON,**  
Deputy Minister of Mines.

Toronto, 12th March, 1923.

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The department has a wide range of information on Canada's Natural Resources available to the public and invites enquiries of all kinds: Minerals, Forest Products, Agricultural Opportunities, Waterpowers.

Send for pamphlet "Minerals and Mining Industries on the Canadian National Railways."

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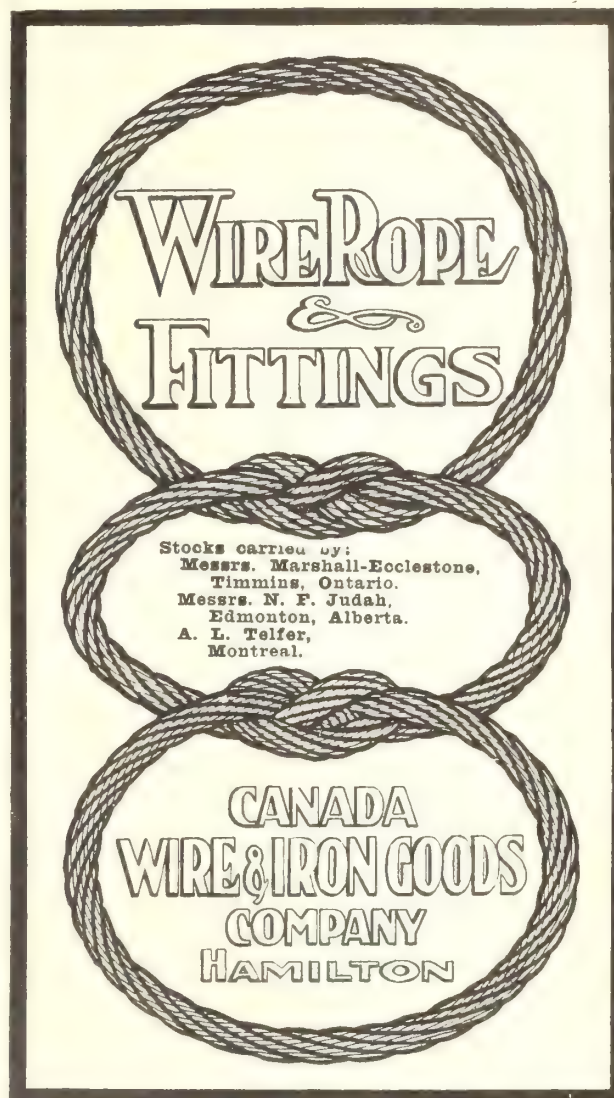
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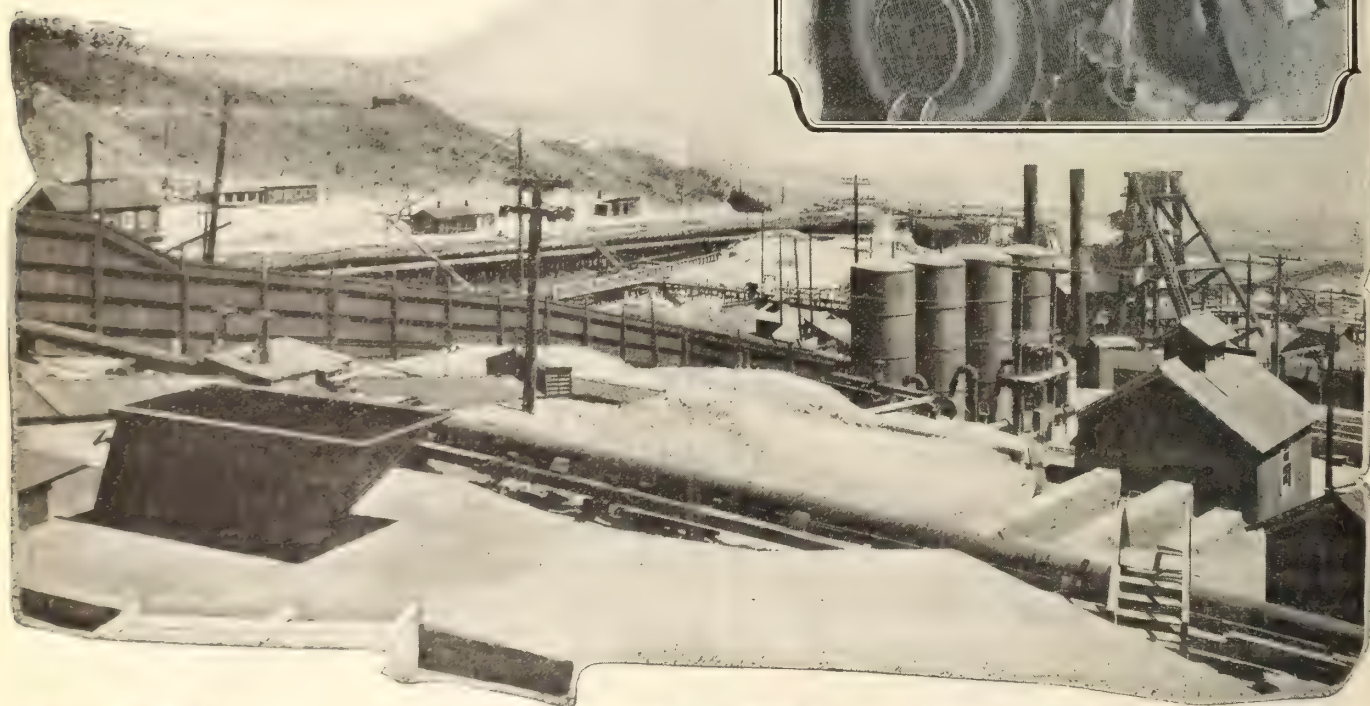
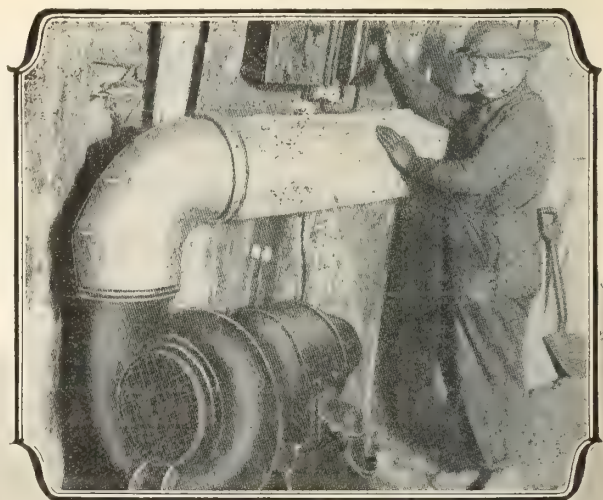
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# CANADA

## DEPARTMENT OF MINES

HON. CHARLES STEWART, *Minister*

CHARLES CAMSELL, *Deputy Minister*

### MINES BRANCH

#### Recent Publications

**Phosphate in Canada**, by H. S. Spence.  
The Preparation, Transportation and Combustion of Powdered Coal, by John Blizard.

**Road Materials along the St. Lawrence River**, from Quebec Boundary to Cardinal, Ont., by R. H. Picher.

**Building and Ornamental Stones of Canada** (British Columbia.) Vol. V., by W. A. Parks, Ph. D.

**Barium and Strontium in Canada**, by H. S. Spence.  
The Coalfields and Coal Industry of Eastern Canada, by F. W. Gray.

**The Value of Peat Fuel for the Generation of Steam**, by J. Blizard, B. Sc.

**Analyses of Canadian Fuels**. Parts I to V, by E. Stansfield M. Sc., and J. H. H. Nicolls, M. Sc.

**Graphite** by H. S. Spence.

**Gas Producer Trials with Alberta Coals**, by J. Blizard and E. S. Malloch.

**Summary Report of the Mines Branch, 1920.**

The Mines Branch maintains the following laboratories in which investigations are made with a view to assisting in the development of the general mining industry of Canada:—

**Fuel Testing Laboratory.**—Testing value of Canadian fuels for steam raising and production of power gas; analyses, and other chemical and physical examinations of solid, liquid and gaseous fuels are also made.

**Ore-Dressing Laboratory.**—Testing of Canadian ores and minerals, to ascertain most economical methods of treatment.

**Chemical Laboratory.**—Analysing and assaying of all mineral substances and their manufactured products. Copies of schedules of fees, which are slightly in excess of those charged by private practitioners, may be had on application.

**Ceramic Laboratory.**—Equipment is such that complete physical tests on clays and shales of the Dominion can be made, to determine their value from an economic standpoint.

**Structural Materials Laboratory.**—Experimental work on sands, cements and limes is also undertaken.

**Applications for reports and particulars** relative to having investigations made in the several laboratories should be addressed to The Director, Mines Branch, Department of Mines, Ottawa.

**Summary Report.** The annual Summary Report of the Geological Survey is now printed in parts. Applicants should, therefore, state what particular geologist report is required, or what subject they are interested in.

**Memoir 108.** The Mackenzie River Basin, by Charles Camsell and Wyatt Malcolm.

### GEOLOGICAL SURVEY

#### Recent Publications

**Memoir 119.** The Reed-Wekusko Map-Area, Northern Manitoba, by F. J. Alcock.

**Memoir 121.** The Malagash Salt Deposit, Cumberland County, N. S., by A. O. Hayes.

**Memoir 123.** Sixty-mile and Ladue Rivers Area, Yukon, by W. E. Cockfield.

**Memoir 125.** Sedimentation of the Fraser River data, by W. A. Johnston.

**Memoir 127.** Beauceville map-area, Quebec, by B. R. McKay.

**Memoir 128.** Winnipegosis and Upper Whitemouth River areas, Manitoba, Pleistocene and Recent deposits, by W. A. Johnston.

**Memoir 130.** Geology and mineral deposits of the Bridge River map-area, British Columbia, by W. S. McCann.

**Memoir 131.** Kenogami, Round and Larder Lake areas, Timiskaming district, Ontario, by H. C. Cooke.

**Map 1585.** Mackenzie River basin, 1922 edition. Geology.

**Map 1751.** Wainwright, Alberta. Topography.

**Map 1752.** Monitor, Alberta and Saskatchewan. Topography.

**Map 1754.** Upper Elk and Highwood rivers, British Columbia and Alberta. Topography.

**Map 1829.** Salmon River area, Portland Canal mining division, B. C. Geology.

**Map 1831.** Vegreville; townships 47 to 55, ranges 11 to 10 west of the 4th meridian, Alberta. Topography.

**Map 1835.** Beauceville, Beauce county, Quebec. Geology.

**Map 1836.** Explored routes in a belt traversed by the Canadian National Railways between Longlac and Nipigon, Ontario. Geology.

**Map 1860.** Keno Hill area, Mayo district, Yukon. Geology.

**Map 1882.** Bridge River, B. C. Geology.

**Map 1901.** Upper Kitzault valley, B. C. Geology.

**Map 1948.** Wanapitei Lake area, Ont. Geology.

Applicants for publications not listed above should mention the precise area concerning which information desired.

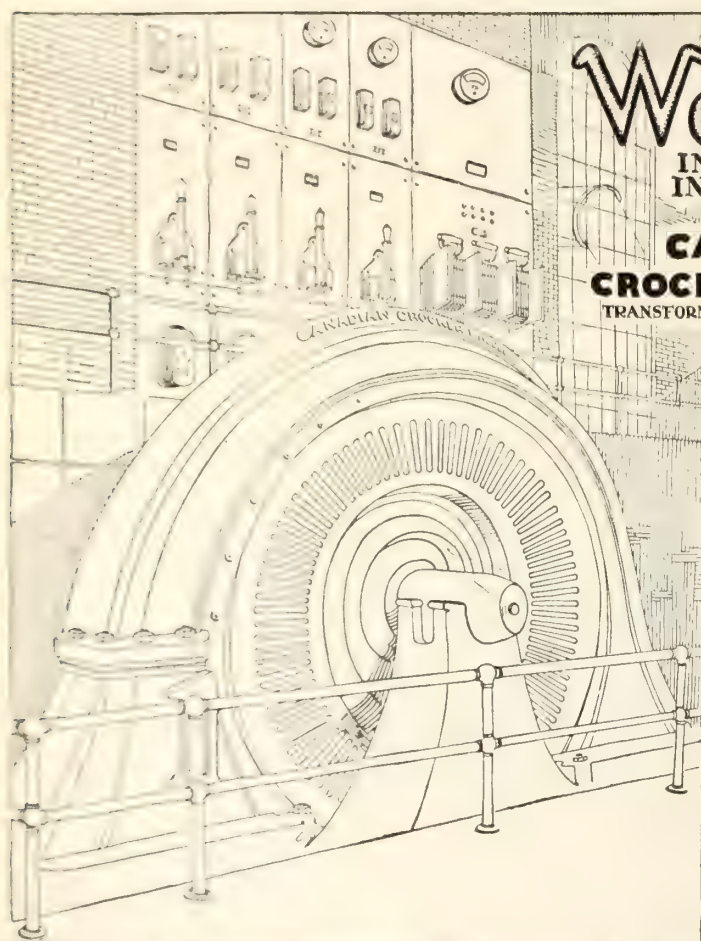
The Geological Survey will, under certain limitations, give information and advice upon subjects relating to general and economic geology. Mineral and rock specimens, when accompanied by definite statements of localities, will be examined and their nature reported upon.

Communications should be addressed to The Director, Geological Survey, Ottawa.



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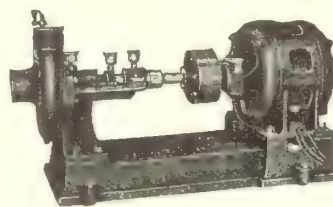
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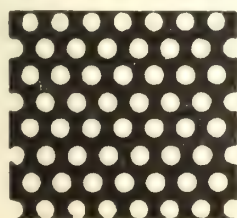
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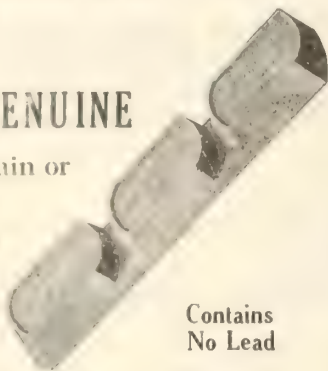
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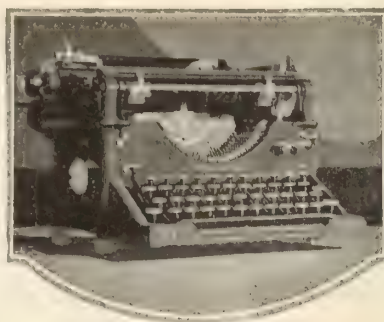
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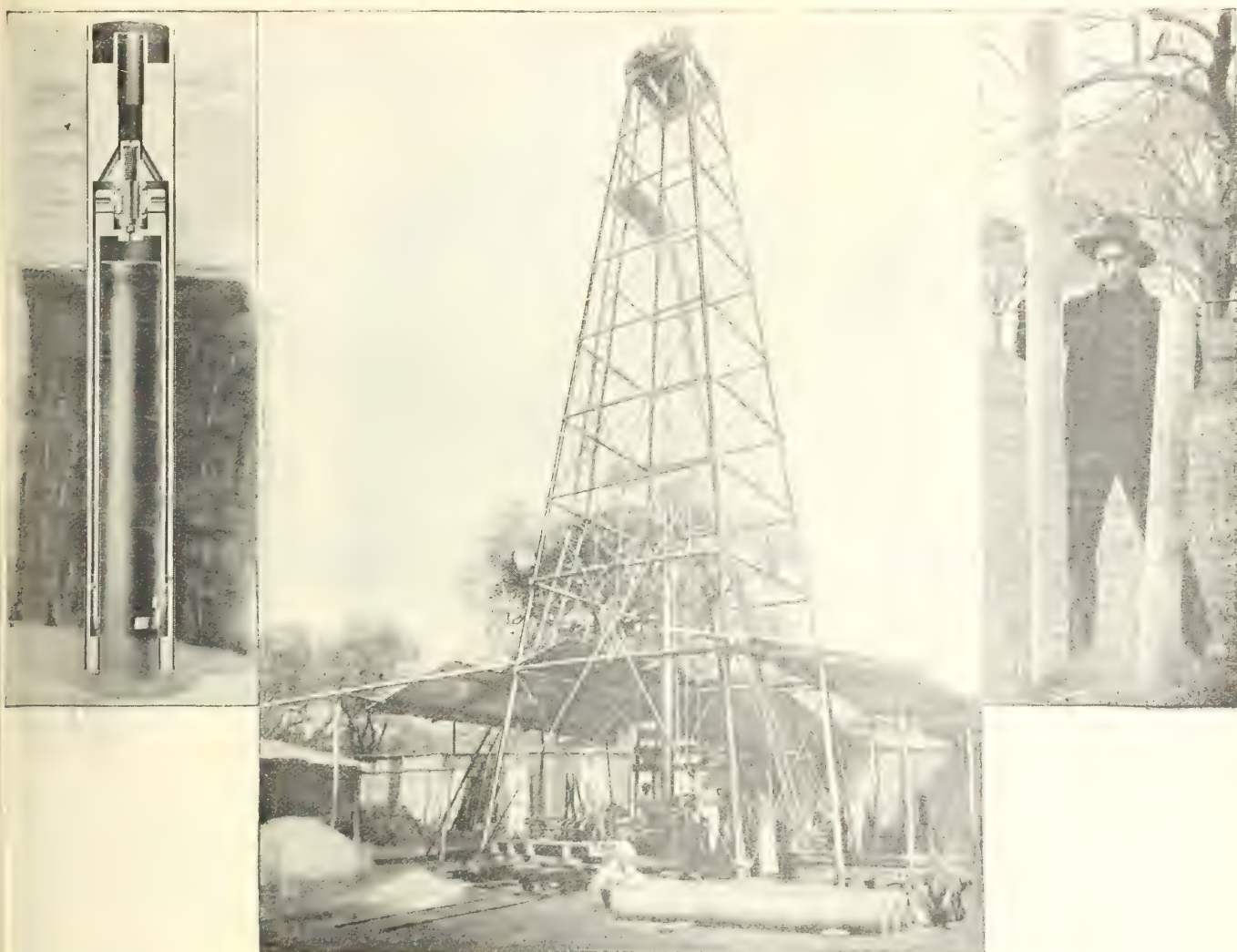


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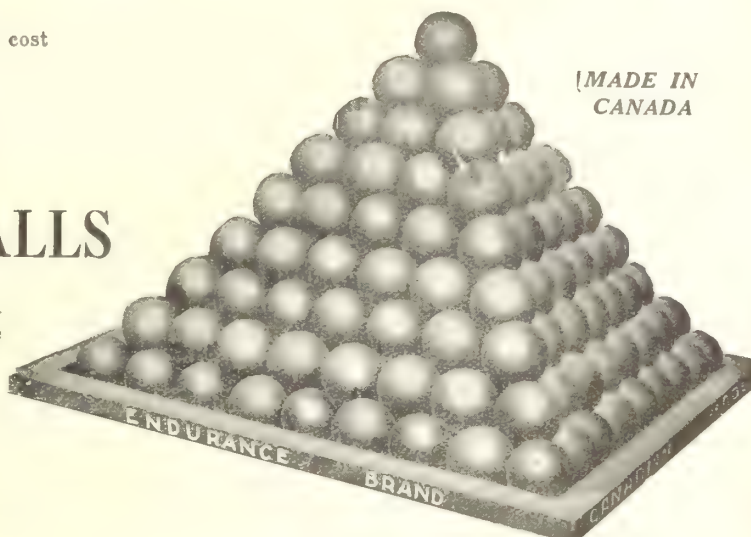
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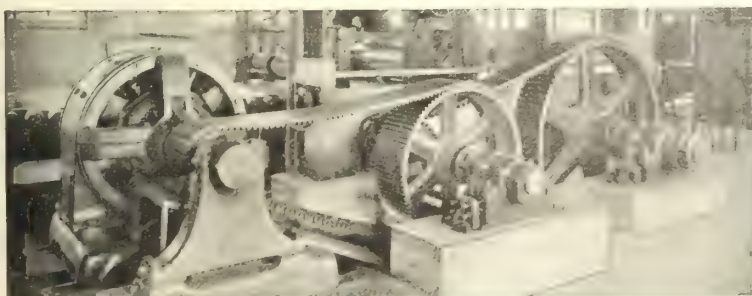
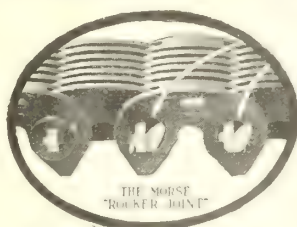
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"When we moved into our present plant thirteen years ago, we installed the present Morse equipment of silent chains for our two lead mills and ten hydraulic pumps. We had always previously used leather belts, but not without considerable trouble. For instance, if the operator was not careful—and gave the motors too great a load, the leather belt would slip and in some cases burn out. While with the Morse Chain Drive we overload them at times up to 15 H.P. without the slightest trouble.

"When we used leather belts on the hydraulic pumps, if a pump packing suddenly gave way, the water would squirt all over the pump as well as adjoining pumps, causing the leather belts to get wet. This often necessitated a shut-down on 3 to 4 pumps to dry out each belt, thus causing a loss of time by the men, which resulted many times in paying overtime to catch up on the work. Of course, with our Morse Chain Drive we have no such trouble—this positive drive prevents slippage and is not affected by water.

"Leather belts lasted us 2 to 3 years at the most, while our Morse Chain Drives have already lasted 3 to 4 times that long and seem good for many more years. So Morse Drives have cut our expense materially, speeded up production, cut out overtime wages and saved floor space, for they operate on shorter centers."



# Ontario's



# Minerals

PROVINCE OF ONTARIO

DEPARTMENT OF MINES

HON H. MILLS, Minister of Mines

## Mineral Areas.

Ontario, with its 407,262 square miles, contains many millions of acres in which the geological formations are favorable for the occurrence of minerals, 70 per cent of the area being underlain by rocks of pre-Cambrian age. The phenomenally rich silver mines of Cobalt occur in these rocks; so also do the far-famed nickel-copper deposits of Sudbury, the gold of Porcupine and Kirkland Lake, and the iron ore of Magpie and Moose Mountain mines.

## Economic Minerals.

In addition to the above, practically all economic minerals (coal and tin excepted) are found in Ontario:—actinolite, apatite, arsenic, asbestos, cobalt, corundum, feldspar, fluor-spar, graphite, gypsum, iron pyrites, lead, mica, molybdenite, natural gas, palladium, petroleum, platinum, quartz, salt, talc and zinc. This Province has the largest deposits on the continent of talc, feldspar, mica and graphite.

Building materials, such as ornamental marble, limestone, sandstone, granite, trap, sand and gravel, lime, portland cement, brick and tile, meet every demand.

## Mineral Production.

Preliminary returns show the output of the mines and metallurgical works of the Province for the year 1921 to be worth \$48,128,387, of which the metallic production was \$27,574,202.

The following figures show the rapid growth of Ontario's mineral industry by five-year periods since 1891:

| Year.         | Value.      | Year.         | Value.       |
|---------------|-------------|---------------|--------------|
| 1891 .. . . . | \$4,705,672 | 1906 .. . . . | \$22,388,383 |
| 1896 .. . . . | 5,235,003   | 1911 .. . . . | 41,976,797   |
| 1901 .. . . . | 11,831,086  | 1916 .. . . . | 65,303,822   |

## Dividends.

Dividends and bonuses paid to the end of 1921 amounted to \$23,140,734 for gold mining companies, and \$84,388,185 for silver mining companies or a total of \$107,528,919.

## Mining Regulations.

A miner's license costs \$5.00 per annum, and entitles the holder to stake out in any or every mining division three claims of 40 acres each. After performing 200 days' assessment work on a claim, patent may be obtained from the Crown on payment of \$2.50 or \$3.00 per acre, depending on location in unsurveyed or surveyed territory.

## Assay Office.

The Provincial Assay Office at No. 5 Queen's Park, Toronto, is maintained by the Department of Mines for the free identification of minerals, free assays under the provisions of the Mining Act of Ontario, and also for general assay work as per the Schedule of Charges which may be obtained on application.

## Temiskaming Testing Laboratories

The Department maintains, at Cobalt, an ore sampling and testing laboratory which is now prepared to receive parcels of gold ore from 100 pounds upward, and after sampling and assaying the same to pay to the shipper the value thereof, less treatment charges. The purpose is to afford a market for ores extracted by prospectors and others in developing their mining claims, enabling them to obtain funds which they can use for further work and to report on the most satisfactory method of treatment. Fuller information may be obtained on application to the Manager, Temiskaming Testing Laboratories, Cobalt, Ontario.

## Publications.

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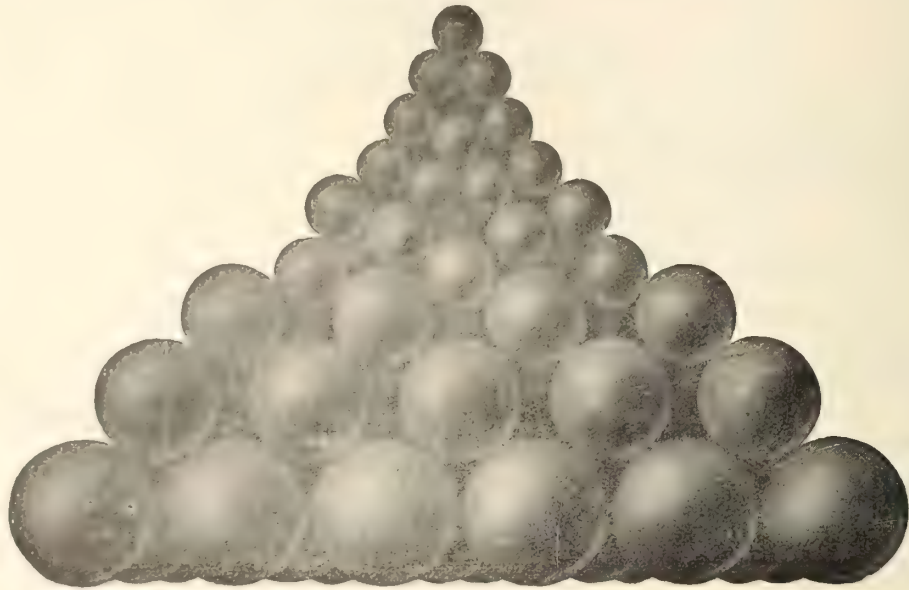
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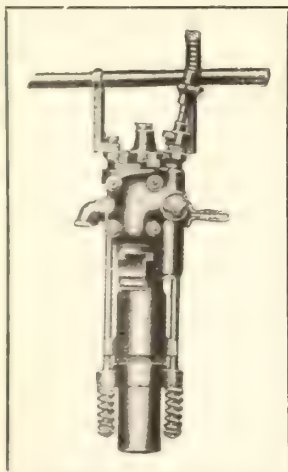


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## :-: EDITORIAL :-:

### THE RIOTS AT THETFORD

After a week of disturbance and idleness, the miners of the Asbestos Corporation in the Thetford asbestos district of Quebec have returned to work. The good offices of several local authorities were used during last week to bring together representatives of the miners and the company. Conferences were held in Sherbrooke and grievances aired and discussed, with the result that the miners are now at work in the pits.

While it has not been announced publicly what the temporary terms of settlement involve or what is back of the trivial complaints the miners brought forward as justification for their precipitate action, the general features of the case present no enigma. The asbestos district of Quebec has never yet become closely identified with the mining industry of Canada, in its personnel. This is, with minor exception, true of its engineering staffs, and it is completely true of its mine workers. There is no ebb and flow of miners between the other mining camps and Thetford. The asbestos district is self-contained — and self-sufficient.

An inevitable result of this isolation is that there have developed among the mine workers of the asbestos district habits peculiar to themselves. Some of these free-and-easy habits are more typical of the farm than of the industrial community and are noticeable to any visitor in the camp. The older generation of workers, coming mostly from the farm, inaugurated these habits, and so long as they worked faithfully and consistently as they would on their own land, these peculiarities did not interfere with their efficiency. It has been noticed of recent years, however, that the younger generation of workers, while retaining the prerogatives of their elders, have been inclined to drop the old habit of faithful service to their employers. The discipline exerted in all modern industrial establishments is the only known cure for such laxity in duty. Colonel MacNutt commenced to apply the ordinary disciplinary methods in order to regain the lost efficiency of his miners, with the result last week of riots and strike.

There is no doubt that, if Quebec is to retain fully her present ascendancy in the asbestos markets of the world, her mines and mills will have to be operated with more efficiency and economy than at present. A number of other producing areas throughout the world are pressing every advantage they possess in order to cut into Quebec's trade. The principal part of the cost of making asbestos ready for export is

labour. To ensure the continuance of production from our asbestos mines and mills, the labour that mans them must have a maximum of efficiency. At present this labour is notably inefficient, having declined sadly in quality during recent years. The late disturbance may prove to be a blessing in disguise, by drawing attention forcibly to the one feature that, above all others, will be the reason for Quebec's continued predominance in asbestos production — efficient and well-directed labour.

### RESULTS FROM THE COAL CAMPAIGN

Our Nova Scotia correspondent records today an active step taken by the provincial government in Halifax with a view to increasing the useful production of the province's coal measures. The present interest in bituminous coal as domestic fuel, via the by-product coke oven, promises a profitable outlet for Nova Scotian coal much larger than any available at present. The officers of the British Empire Steel Corporation are evidently investigating seriously, and with some success, the feasibility of putting their coal on the Montreal market as coke, in competition with anthracite. If this is a paying proposition, the question immediately arises as to the quantity of coal available in Nova Scotia. This question the Mines Department in Halifax has undertaken to answer.

In his announcement at the annual meeting of the Canadian Institute of Mining and Metallurgy in Montreal last March, Dr. Charles Camsell announced, on behalf of the Dominion Fuel Board, that it had decided to direct its attention to three major problems:

- 1.—To determine the economic maximum production of which the Nova Scotian coal fields are capable.
- 2.—To investigate the possibility of converting bituminous coal into coke for domestic use.
- 3.—To demonstrate the eastern limit to which Alberta coal can be shipped profitably.

It is a notable fact that each of these three important problems has now been tackled seriously by private interests, and that in addition the Ontario government has interested itself actively in securing a trial shipment of coal from Alberta. The principal credit for this general and active interest in our country's fuel problem must be given first to the prompt and accurate diagnosis of the case provided by the Dominion Fuel Board, and secondly to the judicious and effective publicity afforded their findings.



It is highly satisfactory to find that the provincial governments and private companies have been impelled to undertake these investigations. In each case they are the authorities or persons directly concerned, and therefore they are most likely to pursue their investigations to a conclusion and to apply them in practice as far as is feasible.

It might appear to the superficial observer that, with these three major problems now in the hands of competent local authorities and with a number of minor problems likewise in good hands, the work of the Dominion Fuel Board and their corps of voluntary advisers was finished. This is far from being the case. The fight for the use of Canadian coal in Canada is only well begun. The Dominion Fuel Board has provided effective leadership for the forces of progress, and has mapped out a plan of campaign that promises to lead on to victory. But the fight is bound to be long, and there will be, doubtless, local set-backs. Without a leader, mis-directed effort, often at cross-purposes, jealousy, bickering, and finally failure or disaster are bound to ensue. With a continuance of the present competent leadership, we shall succeed in applying to the utmost the ideal, "Canadian coal for Canada."

#### "PREVENTIVE GEOLOGY"

The province of Alberta has an active, though small, geological survey department in the form of a section of its Scientific and Industrial Research Council, closely identified with the University of Alberta. Direct evidence of the vigour of this department is afforded by the report recently issued, "An Occurrence of Iron on Lake Athabaska," by Professors John A. Allan and Alan E. Cameron.

In 1921 reports were circulated by Messrs. E. A. and N. C. Butterfield that they had located on the north shore of Lake Athabaska vast deposits of iron ore of exceptional purity. The possible importance of such deposits, even in that remote region, in conjunction with the coal of Alberta prompted the provincial government to investigate the alleged discoveries, although they are east of the interprovincial boundary, in Saskatchewan. The examination, made during the summer of 1922, confirmed previous reports of official explorers, to the effect that there is no high-grade ore available in the area designated, nor is there any likelihood of a concentration of ore beneath the surface. A large part of the area claimed by Messrs. Butterfield to be high-grade ore was found to be merely iron-stained quartzite and other rocks.

After the officers of the Scientific and Industrial Research Council of Alberta had returned from the field last summer, their conclusion as to the true nature of the alleged discoveries of iron ore was made available promptly to the public and was circulated

widely. Now we have chapter and verse for the conclusion, in the form of this 33 page report. The result is negative; but the expense of this little official expedition, which consumed less than three weeks in its geological examination, may have prevented the senseless dissipation of very large sums of money.

#### THE POWER MONOPOLY

The Hollinger has secured the rights to the Long Sault water power on the Abitibi. Apart from that, the present monopoly of hydro-electric power supply for the various camps of the northern gold district of Ontario and Quebec has been preserved by the lease last week of the Quinze power to Mr. Alex. Fasken and his associates. This group control all the developed powers now serving the mining camps, with the exception of that of the Great Northern Power Company, which is too small a power to compete seriously with the monopolists.

It is very satisfactory to know that the provisions under which the Quinze power has been leased to Mr. Fasken will result in the immediate development of a part of it. All the gold camps from Porcupine eastward are thus assured of sufficient power for their requirements from 1924 onwards. Should the gold belt develop to dimensions even approaching those of the Rand, more of the power of the Quinze River would have to be put to use; but that time is not yet in sight.

The price of power to the gold mines is likely to remain high, as at present. The annual rental of \$80,100, in addition to the further annual payments specified the terms of lease, might seem to be onerous. However, when one remembers that this large power on the Quinze will provide cheap power compared with the present smaller installations, and that, safely protected by a monopoly of the supply, the current rates for power are more than likely to be kept at their present high level, it is not hard to understand Mr. Fasken's willingness to meet the terms for which he has contracted.

Luckily there is virtually no competition in the market for gold. The struggle of miner and metallurgist is to reduce the cost of producing the gold below its market value. The Hollinger will have the benefit of power at cost from its prospective Long Sault plant, and will be able to treat ore at a much lower cost than at present. The rest of the mines will be dependent upon the plants controlled by Mr. Fasken and his associates. These men are much too shrewd to prevent the laying of golden eggs by the goose hidden in each gold mine; they will doubtless preserve a judicious balance between their prerogative of keeping up the price of power and the stimulus that cheaper power will provide to mining. Consequently we can look forward with confidence to a permanent and adequate solution of the power problem.

### GREAT BRITAIN'S FINANCE

The British financial year ended on the 31st of March. It had been estimated by the late Chancellor of the Exchequer, Sir Robert Horne, that the national accounts for the fiscal year would show a surplus of between \$30,000,000 and \$35,000,000. But, instead of any such relatively small surplus as that, the actual surplus is one of over \$500,000,000.

This big surplus is mainly attributable to large reductions in expenditures, the chief savings being under the head of civil services and defence services. It is not fanciful to hope that the fact of Great Britain's making the most drastic cuts in Civil Service expenditure with such a satisfactory financial result for the nation at large will not be lost on other countries. We should be greatly surprised if the pruning-knife could not be applied vigorously to Civil Service expenditures in this country and with results equally gratifying to the national purse.

Naturally enough, the question uppermost in people's minds in Great Britain is that of the use to which the present Chancellor of the Exchequer, the Rt. Hon. Stanley Baldwin, will put this large and welcome surplus. The income tax in Great Britain is five shillings in the pound, which means that the ordinary taxpayer has to pay a quarter of his income in direct taxation of this order — people with large incomes have to pay at a far higher rate than that — besides being mulcted in various other ways, and notably in very heavy death duties on his decease. Thus the Chancellor is sure to be bombarded — in fact, is certainly being bombarded now — with supplications for a substantial reduction in the income tax. On the other hand, as he will have to meet the interest on the debt to the United States, and also make a payment on the sinking fund in respect of that debt, it is quite possible that he may decide to maintain the income tax at its present rate. But it is at least a matter for argument whether it would not be a better course to attempt to stimulate trade by a reduction of taxation rather than to maintain the national taxation at its present figure, particularly in view of the widespread unemployment in the country.

This will be decided by the time these lines are in print. But citizens of other countries may well note with admiration the proof afforded, in this large surplus, of Great Britain's remarkable financial strength. The truth seems to be that the most appalling financial burdens cannot avail to hold the British down. Their trade has not expanded to any very large extent during the past year. But if they cannot get a surplus one way, they will get it in another. If they cannot get it by national earning, they will save it by national retrenchment. That is the moral of British financial methods, and it is one which we in Canada may well lay to heart.

"The thirty-first annual meeting of the Nova Scotia Mining Society — and the fifth annual meeting since the N. S. M. S. became one of the milch cows of the Canadian Institute of Mining and Metallurgy — was held in Halifax on the 10th and 12th inst." So says, the "Maritime Mining Record" of Stellarton, Nova Scotia, in its issue of April 25th. The spirit of this utterance is not worthy of the veteran editor of that publication, and we hope that it belies the spirit of the mining engineers of Nova Scotia. The implied financial relation between Mining Society and Institute is falsely stated. The fact is that for the four years 1918 to 1921, the average contribution to Institute funds by members of the Nova Scotia Mining Society was \$7.00, against \$8.63 by members outside Nova Scotia. We hope that a clear view of the mutual benefit obtained through the amalgamation of the provincial Society and the national Institute will not become obscured through any trivial misunderstandings.

Literally thousands of travellers have passed on the winter roads into the gold district of Northwestern Quebec during the last few months. The favourite route has been from Dane, on the Temiskaming and Northern Ontario Railway, which passes by the Argonaut Mine. Among the havens of refuge along this route, none has been appreciated more than this camp where Mr. J. W. Morrison and his aides have welcomed all comers and entertained them right royally, in true north country fashion. The prospectors of the north have developed a very warm regard for the Argonaut and its manager.

### MATACHEWAN

The waters at Matachewan  
 Rippled, as kissed the rising sun,  
 While down below the rapid's fall  
 The gliding eddy made its run.  
 The reek from morning fires swung low  
 The time was two score years ago.  
 The morning mists hung in the bay,  
 Screened by the forest growth on shore,  
 While down the pathway from the hill  
 The factor's daughter slowly bore,  
 For water to the river's strand,  
 The swinging bucket in her hand  
 The Factor's Caledonian pride  
 Refused her Indian lover's prayer,  
 With shaded eyes she gazes down  
 As though to find his image there,  
 The weaving smoke begins to trace  
 The features of her dear one's face,  
 When from the mists along the shore  
 A bark comes gliding to her feet,  
 His messenger to bear her hence  
 To where he waits in sure retreat,  
 By Shakakoba's shaded shore  
 The lovers meet to part no more.

\* \* \*



The factor long has left the stage,  
The lover husband too has gone;  
The maid who gazed with dreaming eyes  
Is now a matron left alone;  
And just as changed from days long gone  
Is all around Matachewan.

A roadway spans the rapid bright,  
Carrying the miles of gleaming lines,  
That bring from harnessed Kageawan  
The magic power to speed the mines;  
And syrens pierce the silence through  
Where once were moose and cariboo.

The river bright bears on its breast  
The power boat with trailing barge,  
While vibrant engines throb and strain,  
The nation's treasure to enlarge,  
And searred with fire is forest fair  
Where drum of grouse once stirred the air.

But still at Fort Matachewan  
The sunlit waters surge and gleam,  
While from the hill, in Autumn's mists,  
One looking far adown the stream  
In fancy sees the bark of gold  
That bore the maid in days of old.

H. E. McKEE.

Some of our readers will recognize the characters of the story above. The factor at Fort Matachewan, Mr. Faries, whose daughter married young Dokis, preceded Mr. Steve Lafraicain, known to all who have travelled the Montreal River. The Indian messenger, Round Eye, died only recently at Elk Lake. "Kageawan" is the Indian name for Indian Chutes, whose power is now being developed. "Shakakoba" is the trading post on the Sturgeon River where the lovers "lived happily ever afterward."

## ROUTES TO THE QUEBEC GOLD FIELD FROM THE NORTH

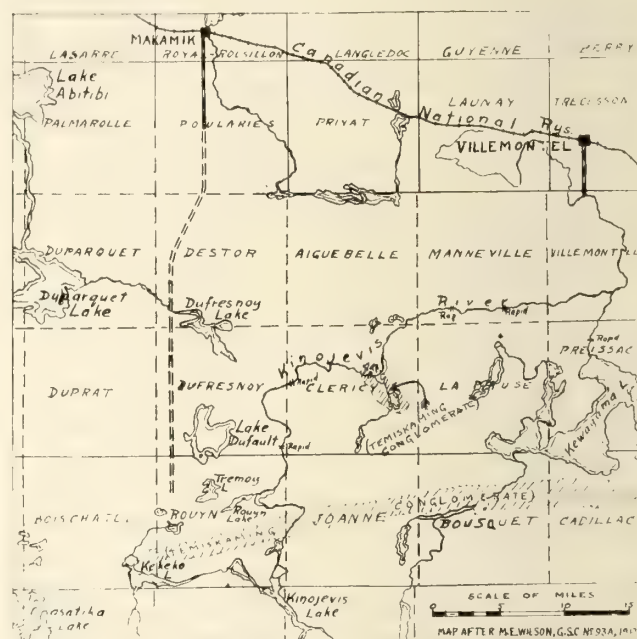
Four weeks ago there appeared in these pages a description of the routes to the Rouyn gold field area from Lake Temiskaming. A description of the routes from the Canadian National Railways to the north of the area has been given by Messrs. Leon Gobeil and R. Audet, inspectors of roads for the provincial government, who have lately completed a road survey southward from Makamik, in "La Presse."

At Villemontel, a station on the Canadian National Railways 12 miles west of Amos, commences the route that was used last year by many entering the new gold field. It will be available for use immediately after the lakes are clear of ice. A colonization road, already constructed, runs twelve miles southward from the station to the Kinojevis River. From here the river is navigable for canoes down stream to Rouyn Lake. There are a number of rapids and portages on the Kinojevis River in this stretch of 35 miles, which make the use of motor boats impracticable.

From Makamik, 40 miles west of Amos on the Canadian National Railways and 35 miles in a direct line

north of the gold discoveries in Rouyn township, there is a road already built for a distance southward of nine miles. The two road inspectors projected this road southward for the remaining 26 miles, and found that a first-class location, with no grades over 10 per cent and with comparatively easy construction, is available throughout the whole distance.

The land of Poularies township for a distance of nine miles from the railway is good agricultural land. Here it changes, outcrops of rock and stretches of swamp appearing, while for several miles the road location crosses sand and gravel plains, most suitable for road construction. In Destor township the location swings slightly to the west, to avoid Dufresnoy, Dufault and a number of smaller lakes. It terminates at Lake Hérey, in the northwestern part of Rouyn township, where active mine development is under way.



The surveyors note that, although the road location in Dufresnoy is level, the surrounding ground is much broken with rock exposures. In the valleys round Lake Dufault there is good farming land.

This proposed road from Makamik southward would take two years to complete. Its purpose would be partly to aid colonization and partly to afford access by the shortest possible route from existing means of transportation.

There are thus two water routes already available for use into the new gold area, a land route from the south which it has been decided to construct, and a land route from the north whose construction is proposed. The route from Ville Marie on Lake Temiskaming will be served by automobiles and motor boats, and is slightly over 100 miles in length. The route by road from North Temiskaming to Lake Opasatika, a distance of 27 miles, thence by water for 20 miles, and again by road for 14 miles, will have a total length of 61 miles to the present gold prospects in the northwest corner of Rouyn township. The canoe route from Villemontel is as stated above, 47 miles long, including the twelve miles of road, and the proposed road from Makamik is 35 miles in length.



# Playing the Great Woods Game - I

HINTS TO A NEW PROSPECTOR FROM AN OLD ONE

BY TOM SAVILLE

Hudson's Bay Bill, Prospector-Hunter, pulled into the trading post at Gogama, which lies about a hundred miles as the crow flies to the north of Sudbury. Bill had started that morning with his dog team from his hunting camp on the Grassy River—Ka-mi-skwa-pi-ka, the Indians called it, but Bill called it "Red Rock" for short. The sun was still high when he drove into the Post. It was almost the end of March and Bill figured this would be about the last chance he would have to get his mail before the break-up. He also wanted to renew his prospector's license before the first of April.

Bill anchored his huskies by tying the bow line of his toboggan to a big pine stump and then entered the Post with his pack of furs, after a lot of "Bojou, Bojou," and shaking hands all round. The Factor tells him—"Bunch of mail for you, Bill,"—and sure enough there is. Toronto "Globes," a bunch of "Literary Digests," some "International Book Reviews," Department of Mines Reports, geological maps, Bulletins of the Canadian Institute of Mining and Metallurgy, a pile of "Canadian Mining Journals" and a few letters.

Bill soon completes trading with his furs with the representative of "The Gentlemen Adventurers Trading into Hudson's Bay," incorporated A. D. 1670, whose motto is, "A skin for a skin"—or in other words, an even break. After getting a few little things that he has run short of, he heads his dogs for his camp, which is located just across the lake. He finds his camp just the way he left it in the fall. Soon he has a good fire going and the kettle boiling and after supper when the huskies are fed and all his chores are fixed up for the night and he has kicked into a change of foot-wear and his beaded moccasin slippers, he wades into his mail. The last letter he opens up is from a couple of young fellows who have decided to break into the great Prospecting Game. This letter interests Bill and he goes over it again. Let's go over it with him.

Toronto University,  
March —

Hudson's Bay Bill,  
Muskeg-Gogama, Ontario.  
Dear Bill,

My class-mate and I have decided to spend the summer up north, prospecting for gold. We happened to see by the "Canadian Mining Journal" that you were a prospector and being inexperienced ourselves, we are taking the liberty of writing you for information and advice. We are both going through for mining and this past winter have read up a good deal of geology and mineralogy and have been over to the Mines Department and obtained the reports and geological maps of the different mining camps of the North. We are taking a blow-pipe outfit and the necessary chemicals to make field tests. We are also taking along a small mortar and pestle for panning. What do you think of the Quebec country? Assuring you that any information, advice or suggestions will be appreciated by us.

Yours sincerely,  
A. Hustler.  
Will Makegood.

## Hudson Bay Bill's Reply

Muskeg-Gogama, Ont.  
March —

A. Hustler and Will Makegood,  
Toronto University.

Gentlemen:

You do me proud by writing me. Sure, I will be glad to tell you what little I know about this Prospecting Game. You done well to get them reports and geological maps from the Department of Mines. That tells me you are on the right trail, and you will profit from the other fellow's experience, I am also glad to learn that you are taking along a blowpipe outfit and a few chemicals to make field tests. There are deposits of minerals and metals other than gold in this North Country and the little blowpipe and chemicals for field tests are sure to hound hell out of them. I would suggest that if you can manage it at all, you make a trip into Porcupine or Kirkland Lake camps before you take the field; it is well worth while.

Now about your outfit. I won't say a word about your grub because nobody knows your capacity and tastes better than you do yourselves. But take along lots, because the wear and tear of packing across the portages and paddling that loaded seventeen-foot guide's special canvas-covered canoe is sure considerable and hard on grubstakes. Then again you are reasonably sure of catching, on your troll, enough fish to keep you going. Take along an extra maple paddle and every man his own camp axe.

Now about your tent; get a 7 by 9 A tent, one that the ridge pole pulls right through and with sleeves that tie tight round the pole to keep the melodious moskitty where he belongs at night—on the outside. You will do well to get an extra yard of duck sewed on the wall of your tent (they are all made too low), as that will give you lots of lap underneath, which will answer the purpose of a ground cloth. And while you are getting your tent fixed up, you might as well do it right; get a piece of fine netting or cheese-cloth sewed right across the door with lots of over-hang—and then you've got a Home.

Next is a tarpaulin—about 8 by 10 is a handy size—to throw over your stuff (sometimes it rains even on a Prospector) or to use as a lean-to for a flying trip and so will save you pulling your tent and outfit down. We always take along for an occasion such as that a home-made canopy or moskitty camp. You can get them already made up; but get the large size.

I suppose you both have a good, big double woollen blanket apiece. And if you haven't got a reflector included in your cookery outfit, put one in; you will find you need it. Some are made of aluminium and are very light. They take the place of a stove and there is a little pan that goes with the outfit. You can bake your pork and beans, bread, bannock, fish and bacon, or roast your venison or moose meat (what's that?!). Anyway, we fellows who live in the woods like to see a reflector included in an outfit where the cooking has to be done round the the camp fire.



I presume you both have a packsack and a tump line each. A light grub hoe is also handy for stripping and pulling the moss off. A light haversack for your note book, compass, maps, samples, lunch, and so on, is also a part of a prospector's outfit.

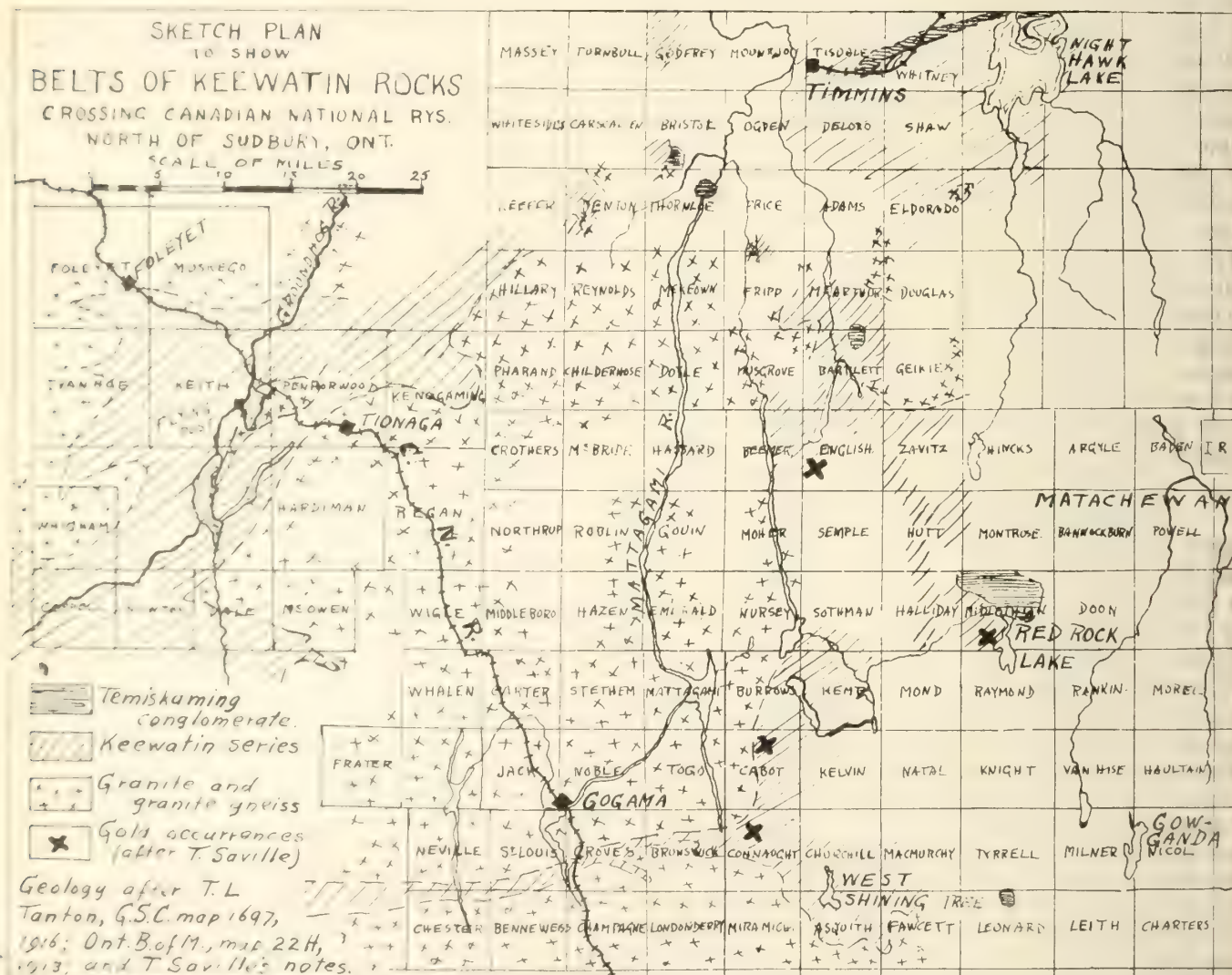
That about completes your outfit. The rest you will rustle for yourselves, but I would suggest you take along that old Mackinaw coat; we all wear them in the cool of the evening and when paddling or packing in the rain.

Now about prospecting for gold. You will be surprised how simple it all is. By making a trip through the established gold camps and reading up the reports and studying the geological maps of the Departments of Mines, you fellows can talk volcanics, shear zones, contacts, porphyry intrusions, and the Timiskaming series, just as if you had been camped on 'em since we were pups. You will soon see that the Keewatin greenstone areas are the foundation to work on, and that they are made up of volcanic lava flows, basalt, andesite, etc. Extending through these greenstone areas and running in a general east by north, west by south direction is found the Temiskaming series, a conglomerate which is easily recognized in the field by its red and black jasper pebbles derived from the iron formation which is usually close by. It is where the porphyry kicks into these volcanics and conglomerates that

the gold values have been found, though not always enough to pay. We usually scout around the contacts of the quartz porphyry and in the porphyry itself if it should happen to be feldspar porphyry.

There is something else that is beginning to look suspicious to us, and that is tourmaline. We have noticed that it seems to have an affinity for high-grade occurring in the volcanics. After you have been in the field a while you will observe there is always a "heart" to these mining camps and that "heart" is well defined by shear zones which extend through the country for miles and are easily followed (general direction a little north of east) and are good prospecting where exposed; but they have a bad habit of running into a swamp or some such low ground. Work along these shear zones and across them at intervals, and when you come to that place where you see silicified schist, well mineralized with fine sulphides and that dark, oily, fractured quartz with black tourmaline,—well, then I would suggest you make camp on that little island and go visiting round with a pick and shovel for a while, and *don't forget to pan*.

You ask me what I think about that Quebec country. Well, the geology is right and it looks like they have another concentration of values. Let's hope they have—it will do us all good. Now about this district, we are work-



The above sketch map will serve to indicate the two belts of Keewatin rocks that stretch westward from the known gold areas and cross the Canadian National Railways near Gogama and Tionaga. Mr. Tom Saville has been at work on the southern belt for several years, with encouraging results. He says there is plenty of room on promising ground in this belt for many more prospectors, and invites them to help him in its exploration and development. —Ed.



ing in. We are convinced that both the Porcupine and Kirkland Lake belts extend and cross the Canadian National to the north of Sudbury. The south or Kirkland Lake-Matachewan-Shining Tree belt crosses just below Gogama at mileage 81, and the Porcupine belt crosses at the Ground Hog river between Foleyet and Tionaga. Lying between the two is another belt which crosses the Grassy River and shows up good at Kam-shawa-pi-ka or "Red Rock." The two southern belts can best be tapped from Gogama, and the Northern or Porcupine belt is best worked from Ka-ka-tush or Ground Hog, which you will see by your map lies a little to the east and south of Foleyet, at a divisional point on the Canadian National.

Now, that's about as far as I can go. I might tell you, seeing that prospectors are few enough, to take good care of yourselves, and every time you come to a rapid and are tempted to run it, land and see if there is a portage. If there is, *pack across*; the Indians must have cut it for some purpose, even if only to keep your grubstake dry. And then on the big lakes, if you have to cross, do it when it's calm—in the early morning or at sunset when the wind usually goes down. And, remember what Drummond said—"You can't get drowned on Lac St. Pierre so long as you stay on the shore." Anyhow, paddle close to the shore, and you won't have so far to swim. Camp on the islands as much as you can—not so much chance of a bush fire starting, to say nothing of being protected from one that someone else has started, and also from the flies—bless their little hearts!

Now, fellows, whether you decide to come up here and work alongside us, or whether you go into Quebec, here's hoping that you catch up with a "concentration" before the snow flies.

Sincerely,  
Hudson's Bay Bill

P. S.—I would like to know how you fellows make out. Write us some time when you feel like it.

### NEW MAP OF LEEDS COUNTY

"Geology and Minerals of the County of Leeds" is the title of Part 6, Vol. 31 (1922) of the Ontario Department of Mines. This report and map by Professor M. B. Baker extends eastward the Frontenac County area mapped on the same scale (a mile to the inch) and published in 1916, and provides the first large-scale map of the area. The geographic base is the excellent contoured map of the Department of Militia and Defence.

The southwestern half of the map sheet is occupied by the pre-Cambrian rocks, principally gneisses and crystalline limestone of the Greenville series intruded by Algonian granite, and is overlaid in places with Potsdam sand stone and basal conglomerate of Cambrian age. Mica, feldspar and granite paving blocks and monumental stone are the economic mineral products of this part. The northeastern portion of Leeds County is underlaid by limestones of Ordovician age, and forms level farming land.

Gradually by means of Professor Baker's mapping this long-neglected part of eastern Ontario is being covered by maps that are not only interesting in the geological sense, but may be useful in aiding a modest mineral development.

During 1922 Canada imported petroleum to a value of \$37,390,000, about two-thirds of it from the United States and the remainder chiefly from Mexico and Peru.

### LETTERS FROM READERS

#### Mr. Nichols' Letter.

We regret that Mr. Nichols' letter last week on page 318 was in one place mangled in the press. At the top of the second column a line was left out, the completed paragraph reading thus: "The definite opinion of those submitting the amendments, in collaboration with a great number of others intended in them, was, and is, that the institute membership should not be restricted to professional men, but should be restricted to men of responsibility, or worth, in, and to, the industry . . . ."

#### The Prospector and Fires

To the Editor,

Canadian Mining Journal.

Sir:

I see by your editorial of April 20th, "The Prospector and Forest Fires," that the lumberman accuses the prospector of starting bush fires, and I note with appreciation that you left very little unsaid in the prospector's defence.

Now, this question of forest fires is one of the most serious in our North Country—serious not only as a great financial loss that affects us all, but serious as a menace to human life. Who, I ask, is more likely to get caught in a bush fire than the man whose work is in the bush, the prospector? What about the lumberman?—you ask. Well, the lumberman about this time is usually safe out of the woods and on the rivers or lakes, driving his winter's cut of logs, or down at the saw-mill, where he has a chance for his life. But the timber cruiser, the surveyor, the geologist, the prospector,—the men who have to camp in the woods when night overtakes them, miles from their canoe or from a lake to give them a chance for their lives—these are the men who know what they are up against. The moment they shoulder their packs and head off into the woods (after submerging their canoe in a creek or sheltered bay, for safety's sake)—you'll agree with me that a bush fire has a *real* meaning to these fellows.

Again, the prospector is often dependent for his daily bread upon that green strip of standing timber—the only kind of timber where he can hope to trap the fisher, marten or beaver that he hunts during the winter to provide his grubstake for next summer's work.

Many more reasons could be advanced to prove that the prospector is *NOT GUILTY* of starting bush fires, but time and space prevent.

In conclusion I will remind the lumberman that the two best fire-rangers he ever had or is likely to have are the two men most vitally interested in the preservation of our forests from fire—the noble Red Man, and Esau, the bona fide prospector.

Gogama, Ont.

Tom Saville.

### MANGANESE-SILVER ORES

A report by the United States Bureau of Mines (serial number 2458) recently issued is entitled "Abstracts from the literature on treatment of manganese-silver ores," by Clevenger and Cornejo. It is a bibliography of 14 pages, compiled by these two researchers in the course of an investigation into the treatment of ores of this character. The references range from 1867 to the present, and the last item is a patented process (1922) by M. F. Fairlie and J. J. Denny, of Cobalt, Ontario, for treating manganiferous ores of the precious metals. The report is available on application to the Bureau of Mines, Washington



# Some of Canada's National Problems

AND THEIR PHYSIOGRAPHIC CAUSE.

BY C. V. CORLESS

(Continued from page 317)

The story revealed is in two chapters. The one is of vast age: the other of extreme youth. The close contact of the two groups of contrasted phenomena is remarkable — more striking indeed, than any poetic antithesis.

## The Ancient Mountain Range

The first chapter tells of a stupendous mountain mass or system, which formed the great primary nucleus or protaxis of North America and which furnished by its erosion much of the material for the more extended balance of the continent. Only the faintest outlines of the remainder of North America had at that remote period been sketched in; and even these outlines were separated from each other, and from the great protaxis, by wide expanses of ocean. Under the incessant action of sun, rain, frost, snow, wind and other geological agencies, acting throughout vast eons of time, probably also with some extraordinary vicissitudes of elevation and depression, this great mountain mass was finally worn down very nearly to what geologists have appropriately called the 'base level of erosion'. This is the briefest possible outline of the chapter of vast age, probably covering many hundreds of millions of years and reaching back into that profound abyss of time before any form of life, either animal or vegetable, had yet appeared on our planet.

## The Glacial Age

The events related in the second chapter, though the last of them ante-dated history by some tens of thousands of years are in comparison very recent. For some cause or causes — whether astronomical, or meteorological or geological, or a combination of these, is not very clear — the earth's climate underwent a great change. The whole earth, and particularly north-eastern America and north-western Europe, became much colder. Throughout hundreds, stretching into thousands of years, snow accumulated in many parts of the world, though our present concern is only with the northern half of our own continent. Finally all the valleys were filled and all the hills or low mountains of the peneplain, that had been left by the previous age-long period of erosion, were covered, to a depth of many thousands of feet. With the steadily increasing depth, and consequent pressure, of snow and ice, slow but irresistible glacial movement began. The accumulation of decayed rock and vegetable mould, the covering of soil but for which land plants and animals, as we know them, could not exist was transported from this area and deposited elsewhere, chiefly to the southward and southwestward. The enormous ice-sheet, equipped on its lower surface with those highly efficient tools of abrasion, viz., loose blocks of rock, stones and grit, moving irresistibly for thousands of years over the solid rock beneath, cut and ground its way ever more deeply into this ancient foundation, rounding, grooving, scratching and polish-

ing the harder formations, gouging more deeply into the softer formations, and gradually producing the glaciated surface practically as we see it to-day. So recent was the final recession of the great ice-cap, and so hard and smooth was the surface it left exposed, that but little erosion has occurred since its retreat. With the several shorter climatic cycles, causing repeated recessions and extensions of the ice-cap, we are not at present concerned.

## Our Heritage from the Glaciers

We are deeply concerned with two of the after-effects of this glaciation. On finally slowly retreating northward to its present restricted areas in Greenland and elsewhere, scattered patches of boulder clay, glacial gravel, sand and rock flour were left indiscriminately in its trail. These scattered patches formed the beginnings of such soil as is found to-day over this great pre-Cambrian area. The second result is perhaps of even greater importance since, among other benefits, it has had the effect in many cases of converting this glacial rubbish into an approach to real soil. The pre-existing well-matured drainage system was completely dis-arranged over the glaciated area. Old stream courses were blocked with glacial rubbish or otherwise changed; many new valleys were partly or completely formed; a completely new surface was left, having little or no relation to the flow of water. In fact, the drainage system of half a continent, the finished topographical product of ages of ordinary erosion, was completely demoralized. Because of the extreme hardness of the very ancient rocks of the pre-Cambrian Shield, millions of years must again elapse before the drainage of this great area becomes once more a mature, orderly system. The muskegs, peat-bogs, lakes, streams, rapids, cascades and waterfalls, to be found anywhere and everywhere, are the visible evidence of this demoralization; as significant to the trained eye of the geologist, as is a disordered room evidence of intrusion to the eye of the keenly observant detective.

Thus are now found together a topography of extreme youth and underlying geological formations of hoary age in this vast area of difficult problems, rigorous climate, scenic enchantment and hidden wealth.

## Drainage

This cursory glimpse of the confused drainage of the pre-Cambrian Shield is about all that can be compressed into one brief address. But before passing on, we must glance at a few additional effects of the recent glaciation of this area which are of great economic importance.

At and near the contact of the extremely hard pre-Cambrian rocks with the softer formations underlying the central continental plain, so intense was glacial scouring and so great was the interference with the drainage when the ice receded, that there are still left, as monuments of this geological epoch, nearly a dozen



of the world's greatest fresh-water seas. All of these are navigable; half of them are already of the greatest importance in the interior commerce of the continent; all are already, or will become an important means of communication between plain and highland. These and the great salt-water sea nearly enclosed by the Shield, Hudson Bay, which is twice as large as the Black Sea, will become more and more important in the transportation system both of this part of Canada and of the central plain contiguous to it. This great sea has only one really large river entering it, the Nelson; a river which has a drainage basin twenty percent larger than that of the St. Lawrence, including its Great Lakes; which drains two-thirds of our Canadian Prairie; and which receives water from the eastern slope of the Rockies.

The dozen great glacial lakes together with St. Lawrence River, nearly encircling the outer rim of the pre-Cambrian Shield, constitute the most remarkable natural interior navigation system in the world. Perhaps equally remarkable is the penetration of Hudson Bay to the very heart of the Shield. But if the glacial demoralization of the Laurentian drainage is remarkable because of its gifts of navigable waters around the rim of the Shield, this glacial action compensated for its destruction of navigable waters in the interior of the Shield by bestowing a second series of gifts which, considering the future needs of the region as well as the limited navigation season due to climate, is of even greater importance. In place of a few large rivers, cut down to easy, probably navigable, gradients, we have in the interior of the Shield almost innumerable small rivers and large streams, scattered almost everywhere, each stream usually having many rapids, cascades and waterfalls. There is scarcely any part of the area not within easy reach of one or more of these water powers. The immense economic value of these in the grinding of pulpwood and making of paper, as well as in the operation of mines and reduction plants, is only recently coming to be adequately appreciated. There are within this area potential waterpowers awaiting development that will yield many millions of horsepower. Most of these are of moderate size, which is a distinct advantage, since this condition favors steady development in easy stages. There are, however, large waterpowers in considerable number, suitable for wide distribution of electric energy and very large enterprises.

#### Resources of the Shield

The previous account of its position, extent, climate, geology, surface and drainage will have failed in its purpose, if it has not prepared your minds for a discussion of the economic resources of the pre-Cambrian Shield. These chiefly will determine its future importance as an abode for man. The immense power available in the very numerous and widely distributed waterfalls will find its chief use in the development, recovery and manufacture, partial or complete, of the material resources of the area. Incidental to this use, this power will afford certain conveniences to those directly or indirectly engaged in, or supported by, the industries carried on in the area. Economic use of power is primary; all other uses are secondary.

#### Forest Resources

Every one knows that most of our lumber, timber and pulpwood are from this area. Plant food being obtained chiefly from the air, forests thrive on remarkably thin soil. Roughly speaking, the southern one-third of this area is clothed with the greatest remaining forest

reserve in North America. Another third of it is sparsely timbered but the economic value of the timber on this part will be but small except as a supplement to other domestic fuel. Already very large pulp and paper industries have been developed in Ontario and Quebec. Considerable inroads into the well-timbered area have been made, partly by cutting but chiefly by forest fires. If cutting is restricted to mature trees and the unused slash is burned, natural re-seeding will occur very quickly. With rigid inspection and enforcement of proper laws for fire protection, our forest industries can easily be made permanent.

The area suitable for forestry and wholly unsuitable for profitable farming is so great that Canadian consumption of forest products can easily be provided for, and a large annual export of lumber and paper continued, without danger of depletion, thus making our forest industries permanent, if conservation of our timber areas is scientifically undertaken. The drainage conditions already discussed make the streams of immense value to these industries. They provide the cheapest means of transporting logs to the mills and furnish abundance of power at low cost for pulp-grinding and paper-making. The problems involved in making these industries permanent are worthy of the closest attention of our Provincial Governments. These problems may be difficult but the difficulties are not insurmountable, if the best brains, supplemented by technical training and broad experience, are employed and given sufficient freedom and backing to solve them. But no time should be lost, since our annual fire loss has been tremendous.

#### Farming Lands

To mention farming is to bring to your minds the much-talked-of "Clay-belt". The fertile soil of this area was deposited as silt on the bed of the temporary glacial Lake Ojibway, during the period when this depression was blocked to the northward by the retreating ice; just as the rich bottom land in Manitoba and eastern Saskatchewan was laid down on the bed of Lake Agassiz; or as the extremely productive border lands of Lake Ontario, comprising the renowned fruit-belt, were enriched while the St. Lawrence outlet of Lake Iroquois was temporarily dammed by the retreating ice-cap. The "Clay-belt", served by the National Transcontinental Line and our Provincial Railway, lying chiefly in Ontario but extending well into Quebec, is said to comprise 16,000,000 acres or 25,000 square miles, equal to more than half the area of Southern Ontario. But Southern Ontario, though important, is relatively quite small, being rather less in extent than two percent of the great pre-Cambrian area we are considering, or about one percent of Canada.

In addition to the "Clay-belt", a considerable number of the larger valleys, large enough for the development of a wholesome community life, and besides these, quite important areas of flat land that once formed part of the beds of lakes temporarily dammed by glacial rubbish but partly drained by the later lowering of their outlets, are suitable for profitable agriculture. But there are already in existence many small settlements of farmers, eking out an existence with no possibility either of economic success or of wholesome social life. Such settlements should never have been allowed to be formed. Only valleys or other soil-covered areas in which proper economic and social conditions can be developed with reasonable effort — areas in which extent, transportation, drainage and soil are suitable for the development of proper living conditions — should be opened to settlement. All the remaining area within the forested zone, should be carefully protected from fire.



so that it may become re-forested by natural re-seeding as the timber is removed. This is clearly a question of great importance demanding detailed land and forest surveys by experienced men of sound judgment; requiring also a clear-cut government policy looking far forward. Our northern land and forest resources are to be of the greatest permanent value to Canadians. The problem is not easily understood by those living in wide continuous areas of excellent farming land, such as you are familiar with in southern Ontario.

The smaller areas suitable for profitable agriculture may perhaps total 25,000 square miles in addition to the larger "Clay belt." But this estimate is, in my opinion, very liberal. A total of 50,000 square miles of land in the entire pre-Cambrian Shield, suitable for profitable farming, is probably all that may safely be counted on. This would be about ten per cent. of the area of that part of the Shield within suitable climatic limits for profitable cultivation or, say, two and one-half per cent. of the entire pre-Cambrian Shield. Relatively small as that is, it is about twenty five per cent. greater than the famous agricultural area of Southern Ontario.

#### Mineral Resources

We thus see that these two basic industries, agriculture and forestry, though based on large resources in the pre-Cambrian area, and of very great present or potential importance, are, because of climatic limitations or recent glaciation, quite restricted in relation to the vast area, more than half of Canada, which we are considering. The one will be limited to about one-third, and the other, probably to about one-fortieth of the total area of the Shield. What, then, may we consider the greatest resource of this area to be? It was natural that hunting should be the first industry developed; natural that the lumberman and farmer should succeed the trapper; equally natural is it, in an area whose underlying rock formations have so recently been exposed by glaciation, that the prospector should now begin to succeed the woodsman. The miner is not limited by climate as is the farmer or lumberman. We have already noted that there is little or no perennial snow in this entire region. Wherever snow and ice do not form a perpetual mantle; and wherever, because of glaciation, geological formation, or ordinary erosion, there is reasonable rock exposure; and particularly, wherever occasional discoveries occur to inspire interest in prospecting; there will men persist in seeking mineral treasures.

But this is merely negative evidence. What positive evidence of mineral wealth in this great area have we? Let us first consider the kind of evidence we may properly look for in such a case as this. Arable land may easily be traversed, measured and tested. Hence, its value may be estimated with reasonable assurance. Forests may be cruised; their water courses may be observed; and reasonable estimates of their value may be calculated on the basis of these observations. But no one can safely predict that a valuable mineral deposit will be found in a given unprospected township; still less safely can one predict what metals will be produced, should a valuable deposit be found; while the height of wild absurdity would be reached, should one have the folly to venture a prediction as to the value of undiscovered deposits that might be recovered from such a closely limited unprospected area. But does this mean that no prediction regarding our undiscovered mineral resources may safely be made?

#### The Basis for an Estimate

Probably some of you are engaged in the business of life insurance. You might not dare to take an unshared

risk of a million dollars on a single life. You might even hesitate to take a thousand medium-sized risks on a thousand lives in one small town of, say, five or ten thousand people. But you would not hesitate for a moment to take these risks, if the individuals insured were widely scattered over twenty counties; still less, if distributed over the whole province; and even less, if over the Dominion. In spite of the unknown liability of death in an individual case, the work of the actuary has made the business of life insurance one of the safest and most certain in its results; far safer is it than that of the single manufacturer.

So is it with the vast area we are considering. With proper precautions as to spreading our risk, very valuable conclusions may be drawn, based on mining results already obtained in known areas and on such knowledge as we have of general geological formations and other conditions of the pre-Cambrian area as a whole. Such general inferences will, of course, be subject to future modification and closer definition, as knowledge obtained by geologizing, prospecting, development, and mining, increases. But it is very important that we make at present the most accurate forecast possible of the probable mineral resources of this great area, inasmuch as this opinion will have much influence in forming our future policy with reference to more than one-half of Canada.

Aside from the fur-trade, exploration and settlement of this area has been approached from the south. Our transcontinental and provincial railways have given access to little more than its southern fringe. Even this fringe has scarcely been scratched by the prospector, except over a few hundred square miles. Hence our direct knowledge of the minerals of the pre-Cambrian area is confined almost exclusively to a small part of this fringe, in which very important discoveries are continually being made and are likely to be made for generations yet.

#### Production of pre-Cambrian in the United States

There are two small projections of this Shield into the United States: one, already mentioned, extends into New York State and forms the Adirondack Mountains; the other passes round the south-western end of Lake Superior, occupying part of Michigan, Wisconsin and Minnesota. These two projections total only 3 or 4 per cent. of the Shield but they have been much more closely examined than the southern fringe in Canada. Both contain enormous reserves of iron ore. In fact, the Lake Superior Iron Ranges are responsible for the pre-eminence of the United States in the iron and steel trade of the world, furnishing, as these ranges have done for years, over 80 percent of the iron ore smelted in that country. Large reserves of rich iron ore remain; and almost incredibly large reserves of lower grade iron ore, estimated at the enormous figure of 70,000 millions (70 billions) of tons, still lie untouched in this area. The technical problems involved in treating the latter are now being attacked on a large scale by a group of the most highly trained and experienced engineers in the United States. But iron-ore is not the only valuable mineral found in large quantities in this Lake Superior area. The world-famous Michigan Copper Mines are in the same area, in the long finger-like peninsula, known as the Keweenaw Peninsula, projecting to the center of Lake Superior. These mines furnished native copper to the Mound Builders; they have been regularly worked for three-quarters of a century; in normal times they were producing annually more than 100,000 tons of the purest copper marketed; and the extent of their remaining ore is not known but is believed to be very great.



Let us next briefly summarize the more important facts of the little we know of the southern fringe in Canada.

### The Iron Formation in Canada

The iron formations at the south-west end of Lake Superior are not confined to the three states mentioned. They continue into Ontario, both around the end of the Lake and across it, the lake being merely a glacial accident. We have numerous iron ranges on our side of the boundary waters, such as Atikokan, Mattawin, Michipicoten, Moose Mountain and others. Our Canadian iron ore deposits have not been sufficiently explored and developed to permit of an accurate estimate. But geologists of the United States Geological Survey, familiar with the deposits similar to these on their side of the boundary, on the basis of geological evidence and such other facts as were available, estimated the iron ore in this formation in Canadian territory, tributary to Lake Superior, at 9,000 million tons, having an iron content of 35 percent or higher. This included neither the Michipicoten nor the Moose Mountain area. Unfortunately the bulk of this ore, as far as exploration has revealed its chemical composition, will require beneficiating before smelting. As already remarked this problem is being seriously attacked in the United States, and a Commission of the Ontario Government is at work on a report on the iron ore problem. The Research Council also is investigating the same problem.

But, though there would be obvious advantages should we find it possible to develop a large iron industry, based on our own ores, on or near Lake Superior, the Lake Superior depression by no means exhausts the possibilities of iron ore discovery in the pre-Cambrian Shield. Belcher Islands in Hudson Bay are known to have an extensive exposure of iron formation, which may afford some foundation for the tentative prediction made by some of the eminent iron-ore geologists of the United States Steel Corporation, regarding the possibilities of the Hudson Bay depression. Probably the greatest advantage Canadians will reap from the extension of the Provincial Railway to Moose Factory and James Bay, will result from rendering the shores of our great northern Mediterranean sea, and the lower courses of rivers entering it, accessible to explorers and prospectors during four or five months of each year. If this works out as expected, it will prove to be the first successful move toward opening up in a large way to steady exploration, our great pre-Cambrian area. The Hudson Bay Railway in Manitoba will have a similar effect, when completed.

### Nickel, Silver and Gold

We may be uncertain as to what value to place on our very large, rather low grade, iron ore deposits. But there is no hesitation in placing a large valuation on the metals already produced by, and still contained in, the nickel, silver and gold mines of Sudbury, Cobalt and Porcupine areas, each of which has become world-famous for its metallic wealth. The mineral riches of these three camps is almost as well known in Toronto as in the North. The numerous copper-nickel ore deposits in the Sudbury area, though the first discovery was made forty years ago and though very large tonnages of ore have been mined during the last thirty-five years, have still in reserve more than 100 million tons of ore. The Cobalt silver area (using the term to include the extensive silver-producing area of which it is the chief center) has already produced close to 12 thousand tons of pure silver, in addition to other valuable metals. Mr. Cyril Knight, Assistant Provincial Geologist, after an extended study of the area, has re-

cently predicted a further long productive life. Porcupine gold area (using the term for convenience in a similar broad sense, to include the roughly parallel gold belts thirty or forty miles apart and extending from Ontario into Quebec) is the youngest of the three great producers but it has progressed with giant strides. Still longer strides appear to be just ahead. I do not need to quote figures. They are in all the papers. The gold production of the Hollinger, Dome, McIntyre and Kirkland Lake mines will be supplemented by that of many others within a few years.

These three, now world-famous groups of mines, Sudbury, Cobalt, Porcupine, have already produced metals of a total gross value of more than five hundred millions of dollars. I am sure you will not be greatly surprised, if I say that, during their total life, the five great groups of mines already found on the southern fringe of the vast pre-Cambrian Shield, viz., Lake Superior Iron, Michigan Copper, Sudbury Nickel, Cobalt Silver, and Porcupine Gold, will produce metals of a gross value, certainly of several, and probably of many, billions of dollars; how many, only a long future will disclose.

Nor should we lose sight of the fact that these five world-famous areas, each of which occupies a first or near-first place among the world's metal producing groups of mines, are not the only well-mineralized areas already known in the southern fringe of the pre-Cambrian. There are numerous others, less in the lime-light, in which patient examination, re-examination, or development is proceeding. Moreover, many less spectacular minerals have been found and worked, some for many years, such as feldspar, talc, graphite, mica, molybdenite and others.

### Projecting into the Future

Now let us consider carefully the significance of these known and proven mineral discoveries. These five fabulously rich mining areas, with numerous other minor discoveries, some of which may develop into very important mines, are all situated in a small part of the pre-Cambrian Shield, the part we happen to have very incompletely examined, merely because it was accessible from settled farming areas, or from the lakes, or because our railways were forced to cross it in order to reach the western plain or the "clay-belt". Next let us reflect on the fact that the remainder of this vast Shield, in so far as it has been revealed to us by a few intrepid explorers, who have penetrated or crossed it in a few places, generally following canoe routes, is known to be broadly similar in glaciation and geological formation. Let us also recall the further fact that, where prospectors have secured a new point of attack as, for instance, near The Pas in Manitoba, made accessible by the Hudson Bay Railway, they have discovered valuable mineral deposits such as Flin Flon, Mandy, and a number of others. Are we not justified in drawing some broad conclusion from these facts? In fact is not some conclusion as to the mineral wealth of the Shield, expressed in general terms, irresistible?

In my Presidential Address to the Canadian Institute of Mining and Metallurgy, a year ago last month, I stated the inference, that appears to me to follow from these facts, in these words: "When Nature transported the soil from this half of Canada to situations climatically more suitable for agriculture, she balanced the loss to future populations by making possible the discovery of inconceivable mineral wealth, which will amply compensate for the greater faith, larger risks, more far-seeing enterprise, and sturdier hardihood, necessary for its discovery and development". Is not this conclusion justifiable? In my opinion, formed gradually during nearly twenty years of residence, and based on careful



observation, experience, and study, in that great region, this is a conservative inference, amply justified by ascertained facts.

### Conclusion

I have referred to this vast pre Cambrian area as the physiographic cause of many of Canada's most difficult national problems. The more you study the relation of this area to the well settled areas of Southern Quebec, Southern Ontario and the Western Prairie; the more you reflect on our national tendency to develop, or even in some cases to over-develop, our comparatively restricted agricultural areas, to the almost total neglect of this greater part of our country; the more you consider the position of the 5,000 miles of railways already built in this territory, their original purpose being chiefly to connect the relatively small and isolated extensions into Canada of the continental plain; the more you come to realize how vast, how compact and how unique is this physical feature, when compared with other parts of Canada east of the Rocky Mountains: the more deeply, I am sure, you will be impressed by the greatness of the problems to which it gives rise; by the reality of its casual relation to them; and by the urgent need of substituting close attention to, and study of, the cause of these problems, for comparative neglect. This group of problems is so vital to our national welfare that we must solve them or risk national disintegration. It is with the hope of conveying to you an outline of this cause, and of awakening a deeper interest in the study of it, that I consented to address you to-day.

We cannot hope to grow into a strong and unified nation by developing our country in isolated patches, which our natural, instinctive love of agriculture has caused us to do. We must make a close study of the intervening area, with a view to its orderly development, not to its exploitation.

It is my opinion that in our mineral wealth, as yet chiefly undiscovered, which we now have such irresistible reason for believing to exist, will be found the best clue to a sound solution for this group of problems. Forest industries, farming, hunting, fishing, production of hydro-electric power, even holiday-making, will all be contributory to the solution. But the key to the solution, the one allurements that will cause men to face the rigors of the north, even beyond the climatic range of profitable agriculture and forestry, will be the hidden mineral wealth, for the discovery of which Nature has by glaciation left the door of her treasure-stocked basement temptingly ajar.

### BENEFIT OF AIR CURRENTS IN MINES

The effect of air currents upon workers in mines has been studied by officers of the United States Bureau of Mines for some years past, and a report, "Physiological Effect of High Temperatures and Humidities with and without Air Movement," by R. R. Sayers and D. Harrington, has now been issued as a bulletin, serial number 2464. The investigations show conclusively that up to a temperature of 98° F. movement of humid mine air reduces considerably the untoward effects that are so noticeable when there is no movement of the air. In still air at a high temperature there is an increase in body temperature and in pulse rate, profuse sweating, and often dizziness and weakness. When the air is kept circulating there is little or no increase in body temperature or pulse rate, sweating is reduced, and after effects are minimized.

### A VISIT TO MR. T. J. BROWN, IN THE NOVA SCOTIA MINES DEPARTMENT.

The other day the writer dropped into the Mines Office, Halifax, where he was met by the new Deputy Minister, Mr. T. J. Brown, with a smile and a warm handshake. While chatting, two questions were sent in from another department to be answered, the exigencies of the moment requiring haste. The Deputy Minister, however, was equal to the occasion and without one moment's delay or hesitation he turned to his own private files and there found the information wanted, although it carried him back over a period of eighty years. It was all done so quietly and yet so quickly and without any assistance from any clerk, that one could not help wondering how much industry it had taken to so gather and record the facts of old-time mining, that it could be found and used in a moment's notice. During most of his life time Mr. Brown has been collecting, compiling and cataloguing information along many lines; and when one looks at the long row of books of Mr. Brown's own making, containing knowledge gathered up in his leisure moments, one can well understand how he was fitting himself for his present position and any other position he might eventually be called upon to fill.

There are some curious facts in these books about things both past and present. They contain the early history of mining in Nova Scotia and many of the original letters that were written in the great battle that raged when the early grants of the coal lands of the Province to a British peer were revoked. Then there is the history of the forming of new mining companies, with the opening up of new collieries in various localities. The events, such as mine fires, floods, or explosions are all recorded. There is also the picture gallery and photos of some of the early mining men who have passed on to finer service. It is most interesting to hear the story and learn of the personal characteristics of such men from the lips of Mr. Brown.

A remarkable letter from the standpoint of a mine manager's interest in his workmen was that written by Richard Brown over fifty years ago. It seems that a Cape Breton miner well known as "Bully MacCormick" had arranged with another miner to have a fight on a certain day at a stated hour. The manager heard of it and wrote a letter to his workmen, beginning with the following very personal touch,—"Friends and neighbours, I entreat you not to go to the brutal exhibition that is to take place on such-an-such a date." He appealed to their humane side, and seemingly not without success, for a foot-note records that "not one man went."

As Mr. Brown has already published one book and has gathered the material for several others, on one of which he is now working, I might be trespassing to further tell of things that I saw and noted.

### HARDENING CONCRETE

Experiments by the United States Bureau of Standards to develop a method of accelerating the hardening of concrete, especially when it is to be used in wet or damp situations, have shown that 4 per cent of calcium chloride added to the mixing water increases the strength of concrete at the age of one day 100 per cent or more. In some cases in two days the strength equalled 75 per cent or more of that normally attained in one month.

The transportation of coal from Sydney, N. S. to Montreal costs about \$1.00 a ton.



# THE MINING DISTRICTS

BY THE JOURNAL'S CORRESPONDENTS.

## NOTES FROM THE NORTH

(Special Correspondence)

**Kirkland Lake** — Six mines are developing one vein system,  $2\frac{1}{4}$  miles in length, at Kirkland Lake, and three of these workings are over 1000 feet in depth. A new company comprising the Elliot-Kirkland and the Macassa on the western end of the main "break" will soon be in operation.

The **Kirkland Lake** or **Beaver Mine**, the western producer in the area, is milling 150 tons daily, the ore coming from various stopes down to the 1000-ft. level. The grade of ore during recent months has been considerably improved, some of the ore on the 800-ft. level being in a dark lamprophyre.

The **Teck-Hughes**, the adjoining mine to the east, which has recently absorbed the Orr property giving a length of 1500 feet on the ore zone, has been producing approximately \$90,000 monthly for several months. The ore averages over \$30.00 per ton and is the highest grade of ore milled in the camp. The shaft is now down 1105 feet, the greatest depth in the area, and the four lower levels are just commencing to be opened up. The 500-ft. level drift has been extended across the Orr property and the 6th. level is also well in on the Orr. A new 3-compartment shaft will probably be sunk and a mill enlargement will undoubtedly be made in the near future while in the meantime the ore reserves are increasing. This would indicate that the property may be on a dividend basis by the end of the year.

The **Lake Shore** 3-compartment shaft is now about 50 feet below the 600-ft. level, the present objective being to sink to and develop the 800-ft. level. The upper levels have been opened up almost the entire length of the property, the ore being treated in a 60-ton mill yielding \$40,000 per month. The mill is being enlarged to handle 300 tons daily. Only recently, a large double-drum electrically driven hoist has been put in operation and a steel shaft house will soon be constructed.

The **Wright-Hargreaves** is also increasing the capacity of its mill, the present output being about 225 tons per day. The cages now run to the 1000-ft. level. The three lower stations at 700, 850 and 1000 feet are in excellent ore; these three levels will now be opened up.

The **Sylvanite**, which is owned by Wright-Hargreaves interests, has developed some rich ore on the 500-ft. level. Drifting and cross-cutting are being done on this level and at the same time the 3-compartment shaft, which is nearing a depth of 600 feet, is being continued to the 800-ft. level. The mine is equipped with a mining plant sufficient to operate in a large way to a depth of 1000 feet or more. Before long this property should be listed among the producers.

The **Kirkland Lake Proprietary**, the easterly producer in the area, has about reached the 800-ft. level.

Extensive lateral operations will be carried on at the two lower levels, namely the 675 and 800-ft., with the hope of putting sufficient ore in sight to keep the 125-ton mill running continuously for some time.

Several other properties are doing extensive operations in the area. The **Continental** is sinking a shaft to a depth of 200 feet on a north-south vein. This property adjoins the Kirkland Lake Proprietary on the east. The **Hunton** is crosscutting on the 375-ft. level. Mining plants are being installed on the **Kirkland-Columbus** and **Highland Kirkland**. Underground operations continue on the **Bidgood**, **Harvey-Kirkland** and **Montreal-Ontario**.

**Larder Lake Area.** — The recently found vein at Pancake Lake on which the Crown Reserve and Associated Goldfields have been developing ore for the past year has been traced by diamond drilling and drifting for a length of more than 3000 feet.

The **Crown Reserve** has crosscut the large No. 2 vein on the 550-ft. level; in about one week hence the No. 1 vein should be encountered. Developments and results to date have been most encouraging, and if drifting on the 550-ft. level gives satisfactory results a mill will be in order.

The **Associated Goldfields** to the west are sinking a 3-compartment shaft from the present 500-ft. level to a depth of 750 feet. Manager T. A. Graves stated at the annual meeting in Toronto on April 26th that the vein on the four levels averaged \$7. to \$10. gold per ton across widths of 5 to 30 feet. If similar values are obtained on the 750-ft. level a mill of about 500 tons daily capacity will be constructed.

The **Anglo-Canadian Explorers**, who have optioned the Emerson claims to the west of the Goldfields, are reported to have encountered continuation of the Crown Reserve graphite vein by diamond drilling. This is the claim on which rich gold-bearing "float" was found and which was diamond-drilled by the Coniagas a few months ago. This syndicate is also obtaining encouraging diamond drilling results on the Walsh-Tucker claims in S. E. Catherine township.

The **Argonaut** mine, 5 miles to the northwest of the Crown Reserve has just completed a 200-ton mill which should commence milling in May. A small tonnage will first be milled and then gradually the tonnage will be increased. Owing to the high copper contents the treatment will be a little out of the ordinary, namely amalgamation, followed by flotation and the tailing cyanided. Important ore-bodies have been developed on the 350-ft. level and at present work is being pushed on the 500-ft. level to encounter the downward extensions of these ore-bodies, which pitch 50 degrees to the northeast.

The **Ossian Mines**, or Hurd-Fishley claims, in Ossian township, have reached a depth of 80 feet with their shaft. The vein across the entire width of the shaft will assay in places \$12.50 gold per ton. The contract calls for 300 feet of drifting on the 100-ft level



**Porcupine.** — On the 400 ft. level of the Vipond a ~~car~~ has been developed, running a little south of east, for a length of 128 feet, over which length the values average \$16.00.

### QUEBEC

**Ville Marie Recording Office** — The minister of Colonization, Mines and Fisheries has issued instructions to open a mining claim recording office at Ville Marie. Mr. Harry Ledden, the recorder at the Bureau of Mines at Quebec, will on May 7th take charge of the new office.

The opening of a recording office at Ville Marie will be welcomed by the prospectors. It means the decentralization of the recording business. Ville Marie being on the most accessible route to the Rouyn camp, the prospectors will be able, on their way out, to attend personally to the registration of their claims and a great deal of unsatisfactory correspondence will thus be eliminated. Recording forms will be more correctly filled in with the aid of the recorder or his assistants. Claims will be at once transferred to the plan, so that an up-to-date map will always be at hand for the benefit of those interested.

At this recording office will be registered mining claims staked in the county of Temiscamingue and a few townships adjoining the Rouyn group. For claims staked elsewhere the recording will still be done at Quebec until such time as it is seen fit to open new recording offices.

**Rouyn Gold Field** — According to P. E. Hopkins, who has recently visited the Rouyn gold prospects, the Powell vein in northwestern Rouyn township which caused the rush of prospectors to the area and which is being developed by the Noranda Mining Co., is 3 to 20 ft. wide for a length of nearly a mile, 500 feet of the vein will average 9 feet in width and channel samples over this section yield favorable assay values. A few grab samples assayed \$6.80 gold per ton. The vein strikes 30 degrees west of north and lies near the contact of a Keewatin greenstone and altered hornblende granite of Algoman (?) age. Portions of the vein are entirely in basalt while other parts are in granite, and values appear to be encouraging in both rocks. The quartz is rose-coloured and stained a rusty brown due to the finely disseminated iron pyrites altering to iron oxide. Forty men are employed under Superintendent Fletcher and Captain Jack Murphy. A considerable amount of trenching is being done and in the near future sinking and drifting will be done. Two small boilers and a 6-drill compressor are already on the property.

A substantial payment falls due in June on the M. Hammill claims which adjoin the Noranda on the north. Much diamond drilling is being done on a vein similar to that of the Noranda.

A proclamation has been issued by the Minister of Lands and Mines, in which all forest land in New Brunswick is proclaimed a protected area. No person may enter any forest land between May 1 and November 1 to camp, fish, picnic or for any other purpose, without first registering with a fire warden, or other authorized person, and obtaining a registration certificate.

### NORTHERN ONTARIO

**Power.** — Three different interests bid for the Quinze power at the recent auction held in the City of Quebec. The bidders were the Montreal Engineering Company (representing the Riordon Company), Nesbitt Thomson & Company, and Mr. Alex. Fasken (representing the Northern Canada Power Company). The power was knocked down to the last at an annual rental of \$80,100 for a term of sixty years. Work on the development of the power will be stated immediately and the company anticipates that by the end of 1924 it will be in a position to deliver 20,000 h.p. A transmission line 120 miles long, with steel towers, will be built to the Porcupine camp and will thus effectually solve the power question, which has retarded the development and expansion of the district for a number of years.

Within the last few days the break-up has occurred and Porcupine mines are now getting sufficient power to operate their mills at capacity. For the first time since the enlarged mill was completed, the McIntyre will be in a position to run it at capacity and will be able to treat about 1000 tons a day, which will add substantially to the production from the district. The Dome, Hollinger and McIntyre together, will treat about 6700 tons a day, while other properties that have been unable to obtain power will be able to go ahead with their plans for development.

It is officially stated that the lease for the development of the Long Sault power on the Abitibi River to the Hollinger has been signed, but as the action between the Power Company and the Hollinger has not yet been settled, it is hardly expected that work will be started until this question is out of the way.

**Kirkland.** — Good progress is being made with the enlargement of the Lake Shore mill and most of the machinery and lumber for the new addition have been ordered and shipped. Steel for the headframe is also in transit. The enlarged plant will have a capacity of 300 tons a day, and it is hoped to have it in operation before the end of the year. During the month of March the company treated 1932 tons and recovered \$40,852, an average of \$21.14 a ton.

The Teck-Huges is proposing to carry on extensive exploration on the 8th, 9th and 10th levels, which will add materially to the ore reserves. Results of development to date on the Orr property have been very satisfactory. The production from the property is being maintained at an average of about \$90,000 a month and the company should soon be in a position to pay off its indebtedness and begin to build up a surplus.

The Sylvanite has again started sinking its shaft below the 500-foot level, and it will be continued a considerable distance before a new level is opened. A considerable amount of drifting has been done and some very favorable indications have been encountered.

The Tonopah Mining Company of Nevada has concluded a working arrangement for three different properties in the Kirkland district, the King-Kirkland, Wood-Kirkland and Moffat-Hall. Shareholders of the King-Kirkland have just ratified a deal under which the Tonopah Company will develop the property and will expend a minimum of \$10,000 every three months. If development is successful and ore to the extent of \$1,000,000 developed, a mill is to be built, the cost of which will be a first charge on the earnings. In this event a company with a capitalization of \$1,000,000 will be formed, of which the Tonopah Company will



get 60% and the King-Kirkland shareholders 40 per cent. The agreement is to remain in force for a period of four years. It is expected that the shaft will be continued to the 1000-foot level. The Wood-Kirkland and Moffat-Hall are to be explored by trenching and diamond-drilling and \$10,000 to be spent on the Moffat-Hall during this year. In the case of the two latter companies the Tonopah will get 70% of the stock of any companies to be formed if developments warrant.

The Bidgood has negotiated a deal for the sale of 1,000,000 shares of treasury stock for \$456,000, the money to be used in the development of the property. The deal was negotiated with J. A. McCausland & Company of Toronto, representing American associates.

The shaft of the Wright-Hargreaves has reached the 1000-foot level and development at this depth is now under way. Arrangements are being made for enlargement of the mill which will bring the capacity up to approximately 400 tons a day.

**Porcupine.** — The Dome financial statement accompanying dividend checks showed that for the year ending March 31st, after allowing \$126,800 for taxes and \$549,488 for depreciation and mine exhaustion, net profits amounting to \$1,877,369 were made. The surplus, which includes a dividend assurance fund of \$1,026,840, stands at \$1,126,694. Net current assets, however, are greatly in excess of this and amount to \$3,077,000. Reserves for plant depreciation and mine exhaustion are carried at \$3,207,243.

During the quarter ending March 31st McIntyre produced \$472,720 and made a profit of \$161,811. The production is very much less than the previous quarter, due entirely to power shortage. For the nine months ending March 31st, there was recovered a total of \$1,666,000 from which a profit of \$689,559 was made, before allowing for depreciation. With sufficient power the company will be able to operate its enlarged mill at capacity for the first time since it was constructed and the earnings and profits of the company should show a very substantial increase.

Nothing new has developed in the Porcupine labor situation, and it is hoped that with plenty of power and work for everybody, this trouble will blow over. The Porcupine camp has suffered greatly from power shortage, and it would be very unfortunate if another setback were given it by a strike of the miners.

**Cobalt.** — The Coniagas expects to have the Beaver mill in operation in June and will be able to treat 150 tons a day. Underground work is being continued and a substantial quantity of good mill rock is being broken. The company has declared a dividend of 2½%, payable May 1st to shareholders of record April 20th.

## NOVA SCOTIA

**Coal Investigations.** — When the Directors of the British Empire Steel Corporation decided to investigate the feasibility of making coke and gas in by-product ovens for the city of Montreal, a new era was opened up to Nova Scotia's coal industry. Shortly afterwards a coal committee was appointed by the Senate in Ottawa to make full inquiry into the coal resources of Canada. The Government of Nova Scotia was the next to follow and now has begun a general stock-taking of its coal supplies in its various coal fields. For this action they were strongly commended by the Mining Society, which recently met in Halifax.

The intention is to ascertain the amount of coal in the coal beds of Nova Scotia; the quality of the different seams with reference to coking; the amount that can be won; the length of time it will take to open up new collieries with the object of doubling the present daily tonnage, and the expenditure necessary to do this work.

This is a big program, but it is being inaugurated by the Provincial Government with vigour and a will to bring it to a successful finish. With a wide knowledge of geological conditions of the Province and the experience gained in practical mining in the different coal fields, it should not be a difficult matter to calculate the coal reserves of the Province. The data gathered within recent years tend to show a much larger quantity than was calculated ten or even five years ago. Some are of the opinion that previous estimates of nine or ten billion tons will be greatly exceeded.

**New Survey of Coal Fields.** — To do this work with precision and despatch, the Government will no doubt engage a capable mining engineer with a knowledge of geological conditions and with large mining experience. He should be familiar with the methods of mining in Nova Scotia and should also know just how long these methods can be carried on with success and what new methods could be introduced and applied to both old and new seams. It is a big job, for a big man, — one who has faith in the mining industry of the Province and who has not yet reached the stage of those who believe that very little more is to be learned of our mineral resources. There are good reasons for thinking that there is yet much coal in certain sections of the Province that will be discovered by a persistent search, and we look forward with faith and hope to a further supplementing of our now known mineral wealth. In the meantime we are getting ready to use the larger "tools of production" illustrated in the "Canadian Mining Journal's" cartoon of a few weeks ago. It is faithful work that is principally required to make the best use of Nova Scotia's coal measures.

The larger coal companies have a fund of new information on which fairly accurate calculation can be based. The British Empire Steel Corporation has spent large sums of money in prospecting their property in Cape Breton, Pictou and Cumberland Counties. Boreholes were put down at different locations to test the depth, thickness and pitch of each seam. Many of the seams proved to be more extensive than was generally supposed. A better knowledge has been gained of the under-sea areas, and better methods of mining by which larger percentages of coal will be won are being evolved with experience.

**Increased Reserve in Pictou.** — The thick seams of the Pictou coal fields have within recent years been proved to contain a much greater amount of coal than was at first calculated. To the large number of seams known for many years a number of others were added about four years ago, all having been found lying at workable depths, one above the other. There are still those who believe that there is much yet to be learned about the coal beds of Pictou County. Here probably more than in any other part of the Province will be witnessed the greatest development of the coal industry in coming years.

That the Springhill coal fields have surprises in store in the way of extensive seams of a fine quality, is



the common belief of mining men who have knowledge of the district. There are few pessimists on the coal question in Nova Scotia and we are inclined to think that when a general survey has been taken, the prospect will be pleasing.

**Analyst to Examine all Coal.** — The quality of the coal is to be determined by an expert analyst, who will test samples from every seam so far determined in the Province. This will form a basis for determining the amount of coal that can be used for coking. There is much to be done along this line, for although in a rough way much knowledge has been gained of most of the seams now being worked, the data are not accurate and the work of gathering information will only be done rightly when it becomes the duty of some person specially appointed for the purpose. For too long the Government of Nova Scotia has been content to receive its knowledge at second hand from the different coal companies, and if, as we are informed, it is about to appoint capable, educated and well-trained men to gather and compile facts about its own mineral resources, it will have taken a long step forward and will be in a position to point with some degree of pride and assurance to the resources the province really does possess.

**Increased Production to be Gauged.** — While this is going on, the coal operators are to be approached to find out what it will cost and the time it will take to open up and develop a sufficient number of new collieries to double the present output. The British Empire Steel Corporation mines eighty-five percent of the present output and is, therefore, in a better position than any other company to give the needed information. It is highly organized and can tell within a few days and a few dollars the money and time necessary to open up the needed collieries. The only uncertain factor is that of labour, and this too may some day soon come down to a spirit of sweet reasonableness. At present it is the unknown quantity and as such it will have to be treated. All other factors being well known, the Government of Nova Scotia will in the future be in a much better position to point to its coal fields and say just how long they will last, and what quantity can be depended upon each year.

**Gold Mining.** — The gold mining industry of Nova Scotia is to receive more attention from now on, and while the same critical examination into the extent of the gold-bearing ores may not be made just now, there will, however, be sufficient direction and supervision given to ensure more intelligent and modern methods in mining, and more profitable processes in gold extraction. Indeed, it would not be any surprise to see an experienced gold miner placed in the field again to advise and direct all effort along practical and economic lines. In this way prospectors and owners of mineral property would from the very beginning be spared much useless expenditure of money and energy and when difficulties did arise in their operations, they would have the advice of one who knew how to overcome them. For prospecting in difficult and almost inaccessible places a light boring equipment is to be supplied. All information about land leases, etc., and all ore samples will receive the prompt attention of the Mines Department. Clearly the department is out to do the most it can for the gold mining industry of the Province.

## ALBERTA

**Coleman Team Wins Cup** — First Aid Team No. 1 of the International Coal and Coke Co., Ltd., of Coleman, has added to its laurels by winning recently the Montizambert Cup from a field of 58 entries from coast to coast. The runners-up were No. 1 Team of the Grand Trunk Railway Shops Stratford, Ontario with No. 1 Team, City Police, Winnipeg third and a team from the Consolidated Mining and Smelting Co. of Trail fourth.

At a public meeting in the opera house at Coleman on April 18th the cup was presented to the winning team by Professor Ottewell, Hon. Sec-Treas. for Alberta of the St. John Ambulance Association. The team comprised Messrs. W. White (captain), D. Roberts, R.M. Greenhalgh, J. D'Andrea and R. Morgan. After the presentation the team received a substantial cheque from the International Coal and Coke Company. Mr. O. E. S. Whiteside, general manager, and Mr. D. Davies, mine manager of the company have taken an active interest in the work of their First Aid teams, the latter being secretary of the St. John Ambulance Association in Coleman.

This is the second important trophy this team has won lately. The Coderre cup, open to competition by mining teams throughout Canada, was won by them for 1922. They have also won a number of other prizes during recent years, including those offered by the Rocky Mountain branch of the Canadian Institute of Mining and Metallurgy. This team is therefore undoubtedly the champion all-round First Aid team of Canada.

## BRITISH COLUMBIA

**Trail Ore Receipts.** — Ore receipts at the Trail smelter, Consolidated Mining & Smelting Co., for the second week of April totalled 10,020 tons, made up as follows:

| Company                                                 | Tons |
|---------------------------------------------------------|------|
| Black Rock, Northport, Wn. . . . .                      | 388  |
| Emerald, Salmon . . . . .                               | 44   |
| Henderson Group, Smithers . . . . .                     | 61   |
| Knob Hill, Republic, Wn. . . . .                        | 318  |
| Lone Pine, Surprise, Last Chance, Republic, Wn. . . . . | 274  |
| Quilp, Republic, Wn. . . . .                            | 86   |
| Ruth, Sandon . . . . .                                  | 45   |
| Rosebery-Surprise, New Denver . . . . .                 | 49   |
| Surprise, Republic, Wn. . . . .                         | 108  |
| Standard, Silverton . . . . .                           | 45   |
| Silversmith, Sandon . . . . .                           | 174  |
| Company Mines . . . . .                                 | 8428 |

10,020

**Dredging Proposed in Revelstoke District.** — The installation of a gold dredge on Gold Stream, near its confluence with French Creek in the Big Bend district of which the city of Revelstoke is the centre, is proposed by the Cal-Canadian Gold Dredging Company. H. E. Moore of San Francisco has secured leases of the ground and is reported to have obtained the financial backing required to proceed with the enterprise.

**Smithers.** — A quarter of a million dollars, it is reported, has been advanced by Messrs. Trites and Wood, of the Premier Mine, for the installation of a concentrator and to provide for further development on the



Babine Bonanza, which James Cronin has been working on for several years. Mr. Cronin was the operator who brought the St. Eugene Mine to the point where it attracted the Canadian Pacific Ry. Co. and subsequently became a large producer. He believes that his northern property will prove to be even a better paying proposition.

**Ainsworth.** — The Florence Mine has been turned over to a syndicate, composed chiefly of Detroit business men, for a consideration of \$1,250,000 and an agreement to spend \$450,000 on development. The terms of the undertaking, which already have been outlined in these pages, have been confirmed. Generally speaking it is a re-organization having as its object the bringing in of new capital. The result, it is said, will be the securing immediately of necessary equipment, development underground on a larger and more systematic scale than heretofore, and generally the placing of the mine on a better basis in point of operation and of production.

**Mining Boom Pending.** — R. H. Kergin, M.P.P., the representative in the British Columbia Legislature of the largest mining district in the West, including as it does both the Portland Canal and the Atlin sections, has returned after touring the cities of eastern Canada and the United States. He says: "The Premier Mine is much more talked about in the East than it is here and there is a great deal of American capital being sent into the country. We are on the eve of a real boom in mining although the people of British Columbia apparently do not recognize this to be a fact."

**"Another Big Mine."** — Dr. George Hanson, of the Canadian Geological Survey, recently addressed the Vancouver Island Prospectors' Association on the geology of the Salmon River District, Portland Canal. He said that the B. C. Silver, next to the Premier, looked like another big mine.

**Mr. Mathewson, for B. C.** — Mr. E. P. Mathewson, formerly of the Anaconda Copper Company, has accepted an appointment as consulting engineer on the staff of the Granby Consolidated Mining and Smelting Company.

**Dual Control in Railway Belts.** — Along the line of the Canadian Pacific Railway in British Columbia there is a strip of land, twenty miles in width on either side known as the "Railway Belt", and the minerals within this area belong to the Dominion Government as to the base metals and the Provincial Government as to the precious metals. In 1890 an order-in-council was passed at Ottawa giving the administration of the base metals to British Columbia and the mineral lands of the "Belt" automatically came under the terms of the "Mineral Act" of the Province. It was thought that the vexatious dual control condition had been eliminated, and it was for a time. A time arrived, however, when the Province applied without satisfaction for the purchase on behalf of a mineral claim holder within the "Belt" of the surface of the land within his claims. Title to the surface under the Agreement would carry the base metals and the Province then would be in a position to convey both precious and base metals under the "Mineral Act." But the Dominion, in the interim, had disposed of the land involved. Its grant carries the minerals and the Province was unable to satisfy the prospector, who had staked in good faith and had fully complied

with the provisions of the provincial law. This is typical of more than one experience. Further complications were caused by the creation of Forest and Park Reserves by the Dominion within the Railway Belt. Withholding of the surface from alienation meant the barring of the particular areas affected to prospectors and to mineral development. Thus a situation has been growing up which the Province considers is seriously hampering the advance of the mining industry. Hon. Wm. Sloan, Minister of Mines, was in Ottawa recently and the issue briefly outlined is one of the matters he discussed with Hon. Charles Stewart, Federal Minister of Mines, and other members of the federal government.

Other blocks exist in British Columbia in regard to which there is similar conflict of authority as between the Province and Dominion. There is the Peace River Block in the northeastern corner of the Province. The royal or precious metals are vested in the Crown in the right of the Province of British Columbia, as is always the case, but the vulgar metals are controlled federally. There is nothing more stultifying than dual ownership when applied to natural resources for the development of which capital is essential. It has proven so in the E. & N. Ry. Belt, Vancouver Island, where the Province and the railway company share authority as to the minerals and at the present time the problem of having this complex situation adjusted and the British Columbia Department of Mines placed in full charge is being amicably worked out by the two principals affected. Mr. Sloan proposes taking up with Ottawa the mineral administration of the Dominion Peace River Lands. He recognizes that if the administration of the minerals within the Island and the Mainland Railway Belts, as well as those within the Peace River Block, can be brought under the Province without reservation it will be an achievement of the highest importance to the mining industry of British Columbia.

## PRODUCTION OF BAUXITE IN 1922

The production of bauxite in the United States in 1922 was 309,600 long tons, valued at \$1,935,800, according to the Geological Survey. These figures show an increase of more than 100 per cent in quantity and of more than \$1,000,000 in value over those for 1921. The Arkansas field produced 266,799 tons, more than double the output in 1921, but still less than half of its yearly maximum. The eastern fields, in Alabama, Georgia, and Tennessee, produced 42,810 tons, nearly four times as much as in 1921 and about the maximum output from those fields. Georgia leads, with an output of 30,417 tons.

Bauxite produced and consumed in the United States, 1921-22, in long tons.

|                | Domestic<br>production | Imports | Exports* | Apparent<br>consumption |
|----------------|------------------------|---------|----------|-------------------------|
| 1921 . . . . . | 139,550                | 27,587  | 5,942    | 161,195                 |
| 1922 . . . . . | 309,600                | 22,219  | 19,617   | 312,202                 |

\*Includes bauxite concentrate.

Domestic bauxite consumed by different industries, 1921-1922, in long tons.

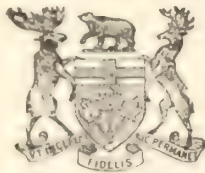
|                | Aluminum | Chemical | Abrasive<br>and<br>refractory. | Total   |
|----------------|----------|----------|--------------------------------|---------|
| 1921 . . . . . | 91,660   | 41,030   | 6,860                          | 139,550 |
| 1922 . . . . . | 211,550  | 78,550   | 19,500                         | 309,600 |



## RACIAL ORIGINS OF CANADIANS

People of British origin constituted 50.40 per cent. of Canada's population in 1921, according to a statement issued by the Dominion Bureau of Statistics. In 1921 English made up 28.26 per cent. of the population; Irish 13.33 per cent.; Scotch, 13.36 per cent.; French, 27.91 per cent.; and all other European races 8.59, i.e. Asiatics made less than 1 per cent. of the population in 1921. More than 81 per cent. of the population in 1921 were of British and French racial stocks.

**CHEMIST** — Some assaying and practical mining experience, also thorough business training, desires position Mine mill or Smelter. Adaptable; efficient good health. Reply: Box 573, Canadian Mining Journal, Gardenvale, Que.



### PURCHASE OF GOLD ORES

The attention of prospectors and others is drawn to the provision in the Mining Act of Ontario authorizing the Department of Mines to purchase parcels of gold ore taken out by prospectors and others in developing or working mining claims. Arrangements have been made by which such parcels of gold ore, whether large or small, will be accepted by the Temiskaming Testing Laboratories at Cobalt, and paid for according to the schedule provided for the purpose. The Laboratories are operated under the auspices of the Department of Mines.

This offers a first class opportunity for testing the value of ores on a large scale, and also of turning ore of good quality into money for carrying on further development work. By special arrangements, on less than carload lots, freight rates on the T. & N. O. Railway are reduced 50 per cent.

The Laboratories are also equipped for working out the best methods of treatment for gold or silver ores of a refractory or unusual character.

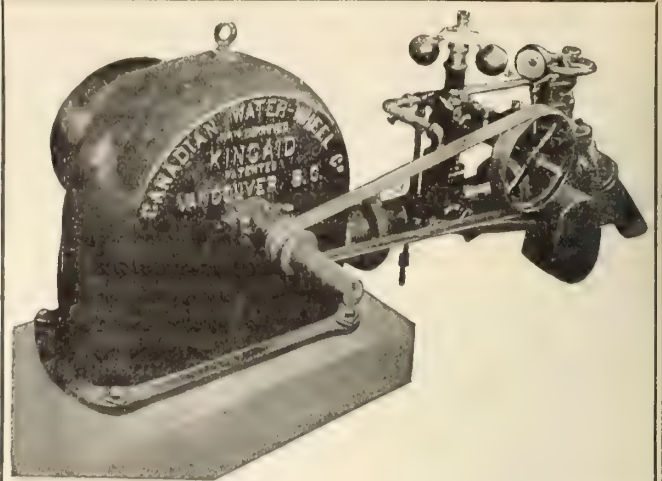
Full information as to treatment charges, schedule of payments, etc., can be obtained from the undersigned, or from A. A. Cole, Manager, Temiskaming Testing Laboratories, Cobalt, Ontario.

THOS. W. GIBSON,  
Deputy Minister of Mines.

Toronto, 12th March, 1923

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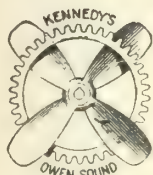
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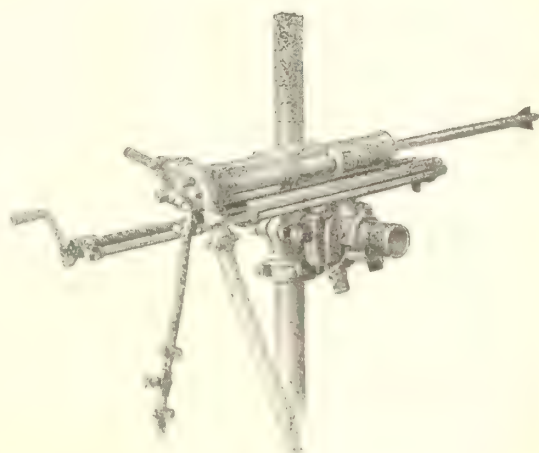
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# PROVINCE OF QUEBEC

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MINISTER OF COLONIZATION, MINES AND FISHERIES, QUEBEC

**MINER'S CERTIFICATES.** First of all, obtain a miner's certificate, from the Department in Quebec or from the nearest agent. The price of this certificate is \$10 and is valid until the first of January following. This certificate gives the right to prospect on public lands and on private lands, on which the mineral rights belong to the Crown.

The holder of the certificate may stake mining claims to the extent of 200 acres.

**WORKING CONDITIONS.** During the first six months following the staking of the claim, work on it must be performed to the extent of at least twenty-five days of eight hours.

**SIX MONTHS AFTER STAKING.** At the expiration of six months from the date of the staking, the prospector, to retain his rights, must take out a mining license.

**MINING LICENSE.** The mining license may cover 40 to 200 acres in unsurveyed territory. The price of this license is Fifty Cents an acre per year, and a fee of \$10.00 on issue. It is valid for one year and is renewable on the same terms, on producing an affidavit that during the year work has been performed to the extent of at least twenty-five days' labour on each forty acres.

**MINING CONCESSION.** Notwithstanding the above, a mining concession may be acquired at any time at the rate of \$5 an acre for SUPERIOR METALS, and \$3 an acre for INFERIOR MINERALS.

The attention of prospectors is especially called to the territory in the North-Western part of the Province of Quebec north of the height of land, where important mineralized belts are known to exist.

**PROVINCIAL LABORATORY.** Special arrangements have been made with POLYTECHNIC SCHOOL of LAVAL UNIVERSITY, 228 ST. DENIS STREET, Montreal, for the determination, assays and analysis of minerals at very reduced rates for the benefit of miners and prospectors in the Province of Quebec. The well equipped laboratories of this institution and its trained chemists ensure results of undoubted integrity and reliability.

The bureau of Mines at Quebec will give all the information desired in connection with the mines and mineral resources of the Province, on application addressed to

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# BRITISH COLUMBIA

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**Aggregate Value of \$734,259,619**

The substantial progress of the Mining Industry of this Province is strikingly exhibited in the following figures, which show the value of production for successive five-year periods: For all years to 1895, inclusive \$94,547,241; for five years, 1896-1900, \$57,605,967; for five years, 1901-1905, \$96,509,968; for five years, 1906-1910, \$125,534,474; for five years, 1911-1915, \$142,072,603; for 5 years 1915-1920 \$189,922,725; 1921, \$28,066,641; for the year 1922, \$35,158,843.

**Production During last ten years, \$339,280,940**

Lode-mining has only been in progress for about twenty-five years, and not 20 per cent. of the Province has been even prospected; 300,000 square miles of unexplored mineral bearing land are open for prospecting.

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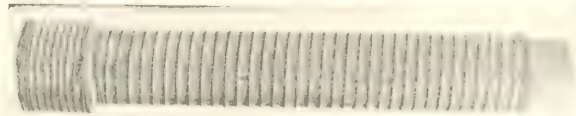
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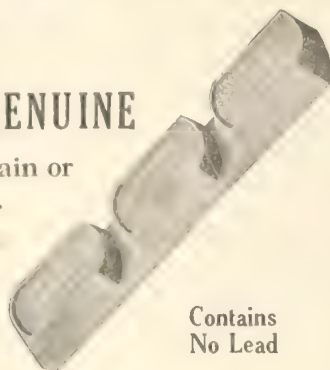
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- Dredging Ropes:**  
Allan Whyte & Co.  
Greening, B., Wire Co., Ltd.
- Drills, Air and Hammer:**  
Canadian Fairbanks-Morse Co., Ltd.  
Canadian Ingersoll-Rand Co., Ltd.  
Canadian Rock Drill Co.  
Denver Rock Drill Mfg. Co., Ltd.  
Herbert, Alfred, Limited  
Holman Bros. Ltd.  
Sullivan Machinery Co.  
The Mine & Smelter Supply Co.
- Drills—Core:**  
Canadian Ingersoll-Rand Co., Ltd.  
Herbert, Alfred, Limited  
Holman Bros., Ltd.  
Sullivan Machinery Co.
- Drill Steel Furnaces:**  
Canadian Ingersoll-Rand Co., Ltd.  
Canadian Fairbanks-Morse Co., Ltd.  
Denver Rock Drill Mfg. Co.  
Herbert, Alfred Limited  
Holman Bros., Ltd.  
Sullivan Machinery Co.
- Drills—Diamond:**  
Sullivan Machinery Co.
- Drill Steel—Mining:**  
Canadian Ingersoll-Rand Co., Ltd.  
Hadfields, Limited  
Mussens, Limited
- Drill Steel Sharpeners:**  
Canadian Ingersoll-Rand Co., Ltd.
- Electric Condensers:**  
Griswold & Co.  
Canadian Rock Drill Co.  
Denver Rock Drill Mfg. Co., Ltd.  
Herbert, Alfred, Limited  
Holman Bros., Ltd.  
Northern Canada Supply Co.
- Drills—Electric:**  
Canadian Fairbanks-Morse Co., Ltd.  
Herbert, Alfred, Limited  
Holman Bros. Ltd.  
Sullivan Machinery Co.  
Northern Electric Co., Ltd.
- Drills—High Speed and Carbon:**  
Canadian Fairbanks-Morse Co., Ltd.  
Hadfields, Limited  
Herbert, Alfred, Limited  
Holman Bros. Ltd.
- Ejectors:**  
Canadian Ingersoll-Rand Co., Ltd.
- Electric Hoists:**  
Canadian Mead-Morrison Co.
- Elevators:**  
Canadian Fairbanks-Morse Co., Ltd.  
Canadian Link-Belt Co., Ltd.  
Sullivan Machinery Co.  
Northern Canada Supply Co.  
Hadfields, Limited.  
Jones & Glassco (Regd.)
- Engineering & Surveying Instruments:**  
Canadian Fairbanks-Morse Co., Ltd.  
Laurie & Lamb.  
C. L. Berger & Sons.
- Engines — Oil:**  
Canadian Ingersoll-Rand Co., Ltd.
- Engines — Ventilating:**  
Canadian Fairbanks-Morse Co., Ltd.  
Canadian Sirocco Co., Ltd.
- Engines—Gas and Gasoline:**  
Sullivan Machinery Co.  
Gould, Shapely & Muir Co., Ltd.  
Laurie & Lamb.  
The Mine & Smelter Supply Co.
- Engines—Haulage:**  
Canadian Fairbanks-Morse Co., Ltd.  
Canadian Ingersoll-Rand Co., Ltd.
- Engines—Steam:**  
Canadian Fairbanks-Morse Co., Ltd.  
Laurie & Lamb
- Engineers:**  
Dresser, John A.  
Door Co.  
Ferrier, W. F.  
Hore, R. E.  
Heves & Sons, Thos.  
Hersey Co., Ltd. Milton  
McEvoy, James C.  
Rogers, George R.  
Ross, Jas. G.  
Stewart, Robert H.  
Tyrrell, J. B.  
Whitman, Alfred B.  
Wilson, Ridgway R.
- Exhauster:**  
Canadian Sirocco Co., Ltd.
- Ferro-Alloys (all Classes):**  
Canadian Steel Foundries, Ltd.  
Canadian Steel Foundries, Ltd.  
Everitt & Co.
- Fire Fighting Supplies:**  
Gutta Percha & Rubber, Ltd.
- Flood Lamps:**  
Northern Electric Co., Ltd.
- Flotation Oil:**  
Hercules Powder Co.
- Flourspar:**  
Consolidated Mining & Smelting Co.  
Everitt & Co.
- Forging:**  
Canada Foundry & Forging, Ltd.
- Herbert, Alfred, Limited  
Holman Bros., Ltd.  
Hull Iron & Steel Foundries, Ltd.  
Smart-Turner Machine Co.
- Coal Screening Plants:**  
Canadian Link-Belt Co., Ltd.  
Canadian Mead-Morrison Co.
- Cobalt Oxide:**  
Everitt & Co.
- Compressors—Air:**  
Belliss & Morcom, Ltd.  
Canadian Ingersoll-Rand Co., Ltd.  
Denver Rock Drill Mfg. Co.  
Herbert, Alfred, Limited  
Holman Bros., Ltd.  
Laurie & Lamb.  
Smart-Turner Machine Co.  
Peacock, Brothers, Limited.
- Concrete Mixers:**  
Gould, Shapely & Muir Co., Ltd.
- Condensers:**  
Canadian Ingersoll-Rand Co. Ltd.  
Smart-Turner Machine Co.  
Belliss & Morcom, Ltd.  
Laurie & Lamb.  
Peacock Brothers, Ltd.
- Concentrating Tables:**  
Herbert, Alfred, Limited  
Holman Bros., Ltd.  
The Mine & Smelter Supply Co.
- Condensers—Electrical Static & Power:**  
Griswold & Co.
- Consulters and Engineers:**  
Milton Hersey Co., Ltd.
- Conveyors:**  
Canadian Link-Belt Co., Ltd.  
Canadian Mead-Morrison Co.  
Jones & Glassco (Regd.).
- Conveyor Belts:**  
Gutta Percha and Rubber, Ltd.
- Conveyor Flights:**  
Canadian Link-Belt Co., Ltd.
- Conveyor—Trough—Belt:**  
Canadian Link-Belt Co., Ltd.  
Hendrick Mfg. Co.  
Jones & Glassco, Regd.
- Copper:**  
Consolidated Mining & Smelting Co.
- Couplings:**  
Hans Renold of Can., Ltd.
- Cranes**  
Canadian Link-Belt Co., Ltd.  
Canadian Mead-Morrison Co.  
Peacock Brothers, Limited  
Smart-Turner Machine Co.
- Crane Ropes:**  
Allan Whyte & Co.  
Canada Wire & Cable Co.  
Greening, B., Wire Co., Ltd.
- Crucibles:**  
The Mine & Smelter Supply Co.
- Crusher Balls:**  
Canada Foundries & Forgings, Ltd.  
Herbert, Alfred, Limited  
Holman Bros., Ltd.  
Hull Iron & Steel Foundries, Ltd.  
Peacock Brothers, Limited.  
The William Kennedy & Sons, Ltd.
- Crushers:**  
Canadian Ingersoll-Rand Co., Ltd.  
Herbert, Alfred, Limited  
Holman Bros., Ltd.  
Hull Iron & Steel Foundries, Ltd.  
Lymans, Limited  
The Mine & Smelter Supply Co.  
Hadfields, Limited
- Cut Gears:**  
Hans Renold of Can., Ltd.  
Jones & Glassco, Regd.  
The William Kennedy & Sons, Ltd.
- Cyanide:**  
Cyanide Plant Equipment:  
The Door Co.  
The Mine & Smelter Supply Co.
- Derricks:**  
Smart-Turner Machine Co.
- Diamond Drill Contractors:**  
Smith & Travers  
Sullivan Machinery Co.
- Digesters:**  
Can Chicago Bridge & Iron Co., Ltd.  
Horton Steel Works, Ltd.
- Diesel Engines:**  
Belliss & Morcom, Ltd.  
Laurie & Lamb.
- Dies:**  
Canada Foundries & Forgings, Ltd.  
Herbert, Alfred, Limited  
Hull Iron & Steel Foundries, Ltd.  
Holman Bros., Ltd.
- Drain Tile:**  
Wetlafer Brothers.
- Dredges:**  
Canadian Mead-Morrison Co.
- Dredger Pins:**  
Hull Iron & Steel Foundries, Ltd.
- Dredging Machinery:**  
Hadfields, Limited  
Hull Iron & Steel Foundries Ltd.
- Cages:**  
Canadian Ingersoll-Rand Co. Ltd.  
The Mine & Smelter Supply Co.  
Herbert, Alfred, Limited.  
Holman, Ltd.  
The William Kennedy & Sons, Ltd.
- Cables—Wire:**  
Standard Underground Cable Co. Ltd.  
Canada Wire & Cable Co.
- Cable Railway Systems:**  
Canada Wire & Cable Co.
- Cam Shafts:**  
Canada Foundries & Forgings, Ltd.  
Herbert, Alfred, Limited  
Holman Bros., Ltd.  
Hull Iron & Steel Foundries, Ltd.  
Peacock Brothers, Ltd.  
The William Kennedy & Sons, Ltd.
- Dump Cars:**  
Canadian Fairbanks-Morse Co., Ltd.  
Canadian Mead-Morrison Co.  
Herbert, Alfred, Limited.  
Holman Bros., Ltd.  
Sullivan Machinery Co.
- Cars:**  
Canadian Mead-Morrison Co.  
Herbert, Alfred, Limited.  
Holman Bros., Ltd.  
John J. Garthshore.  
Peacock Brothers, Limited.  
The William Kennedy & Sons, Ltd.
- Car Pullers:**  
Canadian Mead-Morrison Co.
- Car Wheels and Axles:**  
Herbert, Alfred, Limited.  
Holman Bros., Ltd.  
Hull Iron & Steel Foundries, Ltd.  
John J. Garthshore.  
Peacock Brothers, Limited  
The William Kennedy & Sons, Ltd.
- Carriers (Gravity):**  
Jones & Glassco, Reg.
- Cast Steel Gears:**  
Canada Foundries, Ltd.  
The William Kennedy & Sons, Ltd.
- Castings (Iron and Steel):**  
Herbert, Alfred, Limited.  
Holman Bros., Ltd.  
Hull Iron & Steel Foundries, Ltd.  
Peacock Brothers, Limited.  
The William Kennedy & Sons, Ltd.
- Cement Machinery:**  
Hadfields, Limited.  
Hull Iron & Steel Foundries, Ltd.  
The William Kennedy & Sons, Ltd.
- Chains:**  
Jones & Glassco, Reg.  
Canadian Link-Belt Co., Ltd.  
Greening, B. Wire Co., Ltd.
- Chain Drives:**  
Jones & Glassco (Regd.)
- Chain Drives—Silent and Steel Roller**  
Hans Renold of Can., Ltd.  
Jones & Glassco (Regd.).
- Chemist:**  
Thos. Heyes & Sons.  
Milton Hersey Co.  
Ledoux & Co.
- Chrome Ore:**  
Everitt & Co.
- Crusher Jaws:**  
Canadian Steel Foundries, Ltd.  
The William Kennedy & Sons, Ltd.
- Crushing Rolls:**  
Canadian Steel Foundries, Ltd.  
The William Kennedy & Sons, Ltd.
- Classifiers:**  
The Dorr Company
- Clutches:**  
Canadian Link-Belt Co., Ltd.  
Hans Renold of Can., Ltd.
- Coal:**  
Dominion Coal Co.  
Nova Scotia Steel & Coal Co.
- Coal Cutters:**  
Sullivan Machinery Co.  
Canadian Ingersoll-Rand Co., Ltd.  
Herbert, Alfred, Limited  
Holman Bros., Ltd.  
Peacock Brothers, Limited
- Coal Crushers:**  
Canadian Link-Belt Co., Ltd.  
Peacock Brothers, Limited.
- Coal Mining Machinery:**  
Canadian Ingersoll-Rand Co., Ltd.  
Canadian Rock Drill Co.  
Denver Rock Drill Lfg. Co., Ltd.  
Sullivan Machinery Co.  
Hadfields, Limited.  
Hendrick Mfg. Co.  
Herbert, Alfred, Limited  
Holman Bros., Ltd.



- Pipes:**  
Consolidated Mining & Smelting Co.
- Coal and Coke Handling Machinery:**  
Canadian Link-Belt Co. Ltd.
- Coal Pick Machines:**  
Canadian Ingersoll-Rand Co. Ltd.  
Herbert, Alfred, Limited  
Holman Bros., Ltd.  
Sullivan Machinery Co.
- Frogs:**  
Canadian Steel Foundries, Ltd.  
Hull Iron & Steel Foundries  
John J. Gartshore.
- Furnaces—Assays:**  
Lynch, Limited.  
Mine & Smelter Supply Co.
- Gasoline Engines:**  
Belliss & Morcom, Ltd.  
Laurie & Lamb.
- Gasoline Extraction Compressors:**  
Canadian Ingersoll-Rand Co., Ltd.  
Sullivan Machinery Co.
- Gasoline Tanks:**  
Can. Chicago Bridge & Iron Co., Ltd.  
Horton Steel Works, Ltd.
- Gaskets:**  
Gutta Percha & Rubber, Ltd.
- Gears:**  
Hans Renold of Canada, Ltd.  
Jones & Glassco, Regd.  
The William Kennedy & Sons, Ltd.
- Gears (Cast):**  
Canadian Link-Belt Co., Ltd.  
Hull Iron & Steel Foundries, Ltd.  
The William Kennedy & Sons, Ltd.
- Gears, Machine Cut:**  
The Hamilton Gear & Machine Co.  
The William Kennedy & Sons, Ltd.
- Gold Refiners:**  
Goldsmith Bros.
- Grab-Buckets:**  
Canadian Mead-Morrison Co.
- Hand Cars:**  
Sylvester Mfg. Co., Ltd.
- Hose:**  
Gutta Percha & Rubber, Ltd.  
Dunlop Tire & Rubber Co.
- Hammer Rock Drills:**  
Canadian Ingersoll-Rand Co., Ltd.  
Canadian Rock Drill Co.  
Denver Rock Drill Mfg. Co., Ltd.  
Herbert, Alfred, Ltd.  
Sullivan Machinery Co.
- Hangers and Cables:**  
Stan. Underground Cable Co., Ltd.
- Heating Systems:**  
Canadian Sirocco Co., Ltd.
- High Speed Steel:**  
Hadfields, Ltd.
- Hoists—Air, Electric and Steam:**  
Canadian Ingersoll-Rand Co., Ltd.  
Canadian Rock Drill Co.  
Denver Rock Drill Mfg. Co., Ltd.  
Herbert, Alfred, Ltd.  
Holman Bros., Ltd.  
Jones & Glassco, Regd.  
Mine & Smelter Supply Co.  
Canadian Link-Belt Co., Ltd.  
Peacock Bros., Ltd.  
Sullivan Machinery Co.
- Hoisting Towers:**  
Canadian Mead-Morrison Co.
- Hose:**  
Gutta Percha & Rubber, Ltd.
- Hose Couplings:**  
Laurie & Lamb.
- Hydraulic Machinery:**  
Hadfields, Ltd.  
Belliss & Morcom, Ltd.  
Laurie & Lamb.  
The William Kennedy & Sons, Ltd.
- Oil Storage Tanks:**  
The Toronto Iron Works, Ltd.
- Industrial Chemists:**  
Hersey, M. & Co., Ltd.
- Insulating Compounds:**  
Stan. Underground Cable Co.
- Inspectors:**  
Hersey, M. & Co., Ltd.
- Jacks:**  
Northern Canada Supply Co.
- Jaw & Gyratory Crushers:**  
Herbert, Alfred, Limited.  
Holman Bros., Ltd.
- Lamps — Carbide:**  
Dewar Manufacturing Co., Inc.
- Lamp-Miners:**  
Dewar Manufacturing Co., Inc.  
Northern Electric Co.  
Peacock Bros., Ltd.
- Lead (Pig):**  
Consolidated Mining & Smelting Co.
- Levels:**  
C. L. Berger & Sons.
- Light & Heavy Steel Plate Construction:**  
Hendrick Mfg. Co.  
The William Kennedy & Sons, Ltd.
- Locomotives (Steam, Compressed Air and Storage):**  
Canadian Ingersoll-Rand Co., Ltd.  
Laurie & Lamb.
- Link Belt:**  
Canadian Link-Belt Co., Ltd.  
Northern Canada Supply Co.  
Jones & Glassco, Regd.
- Machine Guards:**  
Greening, B. Wire Co., Ltd.
- Magnesium Metal:**  
Everitt & Co.  
Hull Iron & Steel Foundries, Ltd.
- Manganese Steel:**  
Hadfields, Ltd.  
Hull Iron & Steel Foundries, Ltd.
- Manganese-Steel Trackworks:**  
Canadian Steel Foundries, Ltd.
- Metal Merchants:**  
Consolidated Mining & Smelting Co.  
C. L. Constant Co.  
Everitt & Co.
- Metallurgical Engineers:**  
The Dorr Co.
- Metallurgical Machinery:**  
Dwight & Lloyd Sintering Co.  
The Dorr Co.  
The Mine & Smelter Supply Co.
- Metal Work, Heavy Plates:**  
Horton Steel Works, Ltd.  
The William Kennedy & Sons, Ltd.
- Mica:**  
Everitt & Co.
- Mine Cars:**  
Canadian Steel Foundries, Ltd.  
The William Kennedy & Sons, Ltd.
- Mining Engineers:**  
Hersey, M. & Co., Ltd.
- Mining Drill Steel:**  
Hadfields, Limited.
- Mining Requisites:**  
Dominion Wire Rope Co., Ltd.  
Hadfields, Limited.  
Hull Iron & Steel Foundries, Ltd.
- Mining Ropes:**  
Dominion Wire Rope Co., Ltd.  
Peacock Brothers, Ltd.
- Mine Surveying Instruments:**  
C. L. Berger & Sons.
- Molybdenite:**  
Everitt & Co.
- Motors:**  
Peacock Brothers, Ltd.
- Nickel:**  
The Mond Nickel Co., Ltd.
- Ore Handling Equipment:**  
Canadian Link-Belt Co., Ltd.  
Herbert, Alfred, Limited.
- Ore Sacks:**  
Northern Canada Supply Co.
- Ore Testing Works:**  
Ledoux & Co.  
Can. Laboratories.  
Hoyt Metal Co.
- Ores & Metals—Buyers & Sellers of:**  
Geo. G. Blackwell.  
Consolidated Mining & Smelting Co.  
Everitt & Co.
- Oils:**  
Hercules Powder Co.
- Pavers:**  
Wettlaufers Brothers.  
Gutta Percha & Rubber, Ltd.  
Laurie & Lamb.
- Perforated Metals:**  
Hendrick Mfg. Co.  
Canada Wire & Iron Goods Co.  
Greening, B. Wire Co.
- Pillow Blocks:**  
Canadian Link-Belt Co., Ltd.  
The William Kennedy & Sons, Ltd.
- Pipe — Wood Stave:**  
Pacific Coast Pipe Co.  
Mine & Smelter Supply Co.  
Canadian Ingersoll-Rand Co., Ltd.
- Piston Rock Drills:**  
Mine & Smelter Supply Co.  
Herbert, Alfred, Limited.  
Holman Bros., Ltd.
- Plate Works:**  
Can. Chi. Bridge & Iron Co., Ltd.  
Hendrick Mfg. Co.  
The William Kennedy & Sons, Ltd.  
Horton Steel Works, Ltd.
- Platinum Refiners:**  
Goldsmith Brothers.
- Pneumatic Tools:**  
Canadian Ingersoll-Rand Co., Ltd.  
Herbert, Alfred, Limited.  
Holman Bros., Ltd.
- Portable Column Hoists:**  
Canadian Ingersoll-Rand Co., Ltd.  
Denver Rock Drill Mfg. Co.  
Herbert, Alfred, Limited.  
Holman Bros., Ltd.  
Sullivan Machinery Co.
- Power Factor Correcting Devices:**  
Griswold & Co.
- Power Condensers:**  
Griswold & Co.
- Prospecting Mills & Machinery:**  
Mine & Smelter Supply Co.
- Pumps—Pneumatic:**  
Canadian Ingersoll-Rand Co., Ltd.  
Smart-Turner Machine Co.  
Sullivan Machinery Co.
- Pumps—Steam:**  
Canadian Ingersoll-Rand Co., Ltd.  
Northern Canada Supply Co.  
Peacock Brothers, Ltd.  
Smart-Turner Machine Co.
- Pumps—Turbines:**  
Smart-Turner Machine Co.  
Canadian Ingersoll-Rand Co., Ltd.  
Laurie & Lamb.  
Peacock Brothers, Ltd.
- Pumps—Vacuum:**  
Canadian Ingersoll-Rand Co., Ltd.  
Smart-Turner Machine Co.  
Peacock Brothers, Ltd.
- Pumps—Valves:**  
Peacock Brothers, Ltd.
- Pulleys Shafting and Hangers:**  
The William Kennedy & Sons, Ltd.
- Pulverizers—Laboratory:**  
Herbert, Alfred, Limited.  
Holman Bros., Ltd.  
Mine & Smelter Supply Co.
- Pumps—Boiler Feed:**  
Canadian Ingersoll-Rand Co., Ltd.  
Smart-Turner Machine Co.  
Peacock Brothers, Ltd.
- Pumps—Centrifugal:**  
Canadian Ingersoll-Rand Co., Ltd.  
Laurie & Lamb.  
Peacock Brothers, Limited.  
Smart-Turner Machine Co.
- Pumps—Diaphragm:**  
The Dorr Company.  
The William Kennedy & Sons, Ltd.
- Pumps—Electric:**  
Canadian Ingersoll-Rand Co., Ltd.  
Laurie & Lamb.  
Peacock Brothers, Ltd.  
Smart-Turner Machine Co.
- Pumps—Sand & Slime:**  
Canadian Ingersoll-Rand Co., Ltd.  
Laurie & Lamb.  
Mine & Smelter Supply Co.  
Peacock Brothers, Ltd.  
Smart-Turner Machine Co.  
Sylvester Mfg. Co., Ltd.
- Push Cars:**  
Sylvester Mfg. Co.
- Poultry Netting:**  
Greening, B. Wire Co., Ltd.
- Quarrying Machinery:**  
Canadian Ingersoll-Rand Co., Ltd.  
Canadian Rock Drill Co.  
Denver Rock Drill Mfg. Co., Ltd.  
Hadfields, Limited.  
Herbert, Alfred, Limited.  
Holman Bros., Ltd.  
Sullivan Machinery Co.



- Balls:**  
Hadfields, Limited.  
John J. Gartshore.
- Refiners:**  
Goldsmith Brothers.
- Riddles:**  
Hendrick Mfg. Co.
- Roll Mills:**  
Mine & Smelter Supply Co.
- Roll Shells:**  
The William Kennedy & Sons, Ltd.  
Canadian Steel Foundries, Ltd.
- Roller Chain:**  
Hans Renold of Canada, Ltd.  
Canadian Link-Belt Co., Ltd.  
Jones & Glassco, Regd.
- Rope—Manilla & Jute:**  
Jones & Glassco, Regd.  
Allan, Whyte & Co.
- Rope—Wire:**  
Anglo Canadian Wire Rope Co.  
Allan, Whyte & Co., Ltd.  
Canada Wire & Cable Co.  
Canada Wire & Iron Goods Co.  
Dominion Wire Rope Co., Ltd.  
Greening, B. Wire Co.
- Rolls—Crushing:**  
Canadian Ingersoll-Rand Co., Ltd.  
Everitt & Co.  
Hadfields, Limited.  
Hull Iron & Steel Foundries, Ltd.  
Herbert, Alfred, Ltd.  
Holman Bros., Ltd.  
Wettlaufer Bros.
- Samplers:**  
Canada Metal Co.  
Ledoux & Co.  
Milton Hersey Co.  
Thos. Heyes & Son.  
Mine & Smelter Supply Co.
- Screens:**  
Canadian Ingersoll-Rand Co., Ltd.  
Greening, B. Wire Co.  
Hendrick Mfg. Co.  
Canada Wire & Iron Goods Co.
- Screens—Cross Patent Flanged Lip:**  
Hendrick Mfg. Co.
- Screens—Perforated Metal:**  
Hendrick Mfg. Co.
- Screens—Shaking:**  
Canadian Link-Belt Co., Ltd.  
Hendrick Mfg. Co.
- Screens—Revolving:**  
Canadian Link-Belt Co., Ltd.  
Hendrick Mfg. Co.  
The William Kennedy & Sons, Ltd.
- Separators:**  
Smart-Turner Machine Co.  
Mine & Smelter Supply Co.
- Sewer Pipes:**  
Wettlaufer Bros.
- Shaft Contractors:**  
Hendrick Mfg. Co.
- Sheet Metal Work:**  
Hendrick Mfg. Co.
- Sheets—Genuine Manganese Bronze:**  
Hendrick Mfg. Co.
- Sheets and Dies:**  
Hull Iron & Steel Foundries, Ltd.  
Peacock Brothers, Ltd.  
The William Kennedy & Sons, Ltd.
- Ship Loaders:**  
Canadian Mead-Morrison Co.
- Silent Chain:**  
Canadian Link-Belt Co., Ltd.  
Hans Renold of Canada, Ltd.  
Jones & Glassco, Regd.
- Silent and Steel Roller:**  
Canadian Link-Belt Co., Ltd.  
Jones & Glassco, Regd.
- Saline Refiners:**  
Goldsmith Brothers.
- Smelters:**  
Goldsmith Bros.
- Sledges:**  
Canada Foundries & Forgings.
- Sintering:**  
Dwight & Lloyd Sintering Co., Inc.
- Smoke Stacks:**  
Can. Chicago Bridge & Iron Co., Ltd.  
Horton Steel Works, Ltd.  
Hendrick Mfg. Co.  
The William Kennedy & Sons, Ltd.
- Special Machinery:**  
The William Kennedy & Sons, Ltd.
- Spelter:**  
Consolidated Mining & Smelting Co.
- Sprockets:**  
Hans Renold of Canada, Ltd.
- Canada Link-Belt Co., Ltd.**  
Jones & Glassco, Regd.  
The William Kennedy & Sons, Ltd.
- Static Condensers:**  
Griswold & Co.
- Spring Coil & Clips Electric:**  
Canadian Steel Foundries, Ltd.
- Steel Barrels:**  
Smart-Turner Machine Co.
- Stamp Batteries:**  
Herbert, Alfred, Limited  
Holman Bros., Ltd.
- Stamp Forgings:**  
Canada Foundries & Forgings, Ltd.  
Hull Iron & Steel Foundries.
- Steel Castings:**  
Canadian Steel Foundries, Ltd.  
Canadian Brakeshoe Co., Ltd.  
Hull Iron & Steel Foundries, Ltd.  
Hadfields, Ltd.  
The William Kennedy & Sons, Ltd.
- Steel Drills:**  
Canadian Rock Drill Co.  
Denver Rock Drill Mfg. Co., Ltd.  
Sullivan Machinery Co.  
Peacock Brothers, Ltd.  
Canadian Ingersoll-Rand Co., Ltd.
- Steam Hoisting Engines:**  
Canadian Mead-Morrison Co.
- Steam Engines:**  
Belliss & Morcom, Ltd.  
Laurie & Lamb.
- Steam Traps:**  
Canadian Sirocco Co., Ltd.  
Laurie & Lamb.
- Steel Drums:**  
Smart-Turner Machine Co.
- Steel-Tool:**  
N. S. Steel & Coal Co.  
Hadfields, Limited.
- Structural Steel Work—Light:**  
Hendrick Mfg. Co.  
The William Kennedy & Sons, Ltd.
- Stone Breakers:**  
Holman Brothers, Ltd.  
Canadian Ingersoll-Rand Co., Ltd.  
Denver Rock Drill Mfg. Co.  
Herbert, Alfred, Limited.
- Stone Quarrying Machinery:**  
Canadian Ingersoll-Rand Co., Ltd.  
Denver Rock Drill Mfg. Co.  
Sullivan Machinery Co.
- Sulphate of Copper:**  
The Mond Nickel Co., Ltd.
- Surveying Instruments:**  
C. L. Berger.
- Switches:**  
Canadian Steel Foundries, Ltd.
- Switches and Turntables:**  
John J. Gartshore.
- Tables—Concentrating:**  
Mine & Smelter Supply Co.
- Tanks:**  
Can. Chicago Bridge & Iron Co., Ltd.  
Horton Steel Works, Ltd.
- Tanks—Acid:**  
Can. Chicago Bridge & Iron Co., Ltd.  
Horton Steel Works, Ltd.  
Ontario Wind Engine & Pump Co.
- Tanks—Wooden:**  
Gould, Shapley & Muir Co., Ltd.  
Ontario Wind Engine & Pump Co.  
Pacific Coast Pipe Co., Ltd.  
Mine & Smelter Supply Co.
- Tanks, Cyanide, Etc.:**  
Can. Chicago Bridge & Iron Co., Ltd.  
Horton Steel Works, Ltd.  
Hendrick Mfg. Co.  
Ontario Wind Engine & Pump Co.  
Pacific Coast Pipe Co.
- Tanks—Steel:**  
Canadian Ingersoll-Rand Co., Ltd.  
Can. Chicago Bridge & Iron Co., Ltd.  
Horton Steel Works, Ltd.  
Hendrick Mfg. Co.  
The William Kennedy & Sons, Ltd.
- Tanks—Oil Storage:**  
Can. Chicago Bridge & Iron Co., Ltd.  
Horton Steel Works, Ltd.
- Tanks—Water & Steel Towers:**  
Can. Chicago Bridge & Iron Co., Ltd.  
Horton Steel Works, Ltd.  
Ontario Wind Engine & Pump Co., Ltd.
- Tires—Auto, Truck and Bicycle:**  
Canada Foundry & Forgings, Ltd.  
Gutta Percha & Rubber, Ltd.  
Hadfields, Ltd.
- Trailers:**  
Sylvester Mfg. Co., Ltd.
- Tramway Points & Crossings:**  
Hadfields, Limited.
- Transits:**  
C. L. Berger & Sons.
- Transformers:**  
Northern Electric Co., Ltd.
- Transmission Appliances:**  
Jones & Glassco, Regd.
- Transmission Machinery:**  
Canadian Link-Belt Co., Ltd.  
Hans Renold of Canada, Ltd.  
Jones & Glassco, Regd.  
The William Kennedy & Sons, Ltd.
- Troughs (Conveyor):**  
Hendrick Mfg. Co.
- Trucks:**  
Hammant Steel Car & Eng. Works
- Tubs**  
Hadfields, Limited.
- Tube Mills:**  
Canada Foundries & Forgings, Ltd.  
Herbert, Alfred, Limited.  
Holman Bros., Ltd.  
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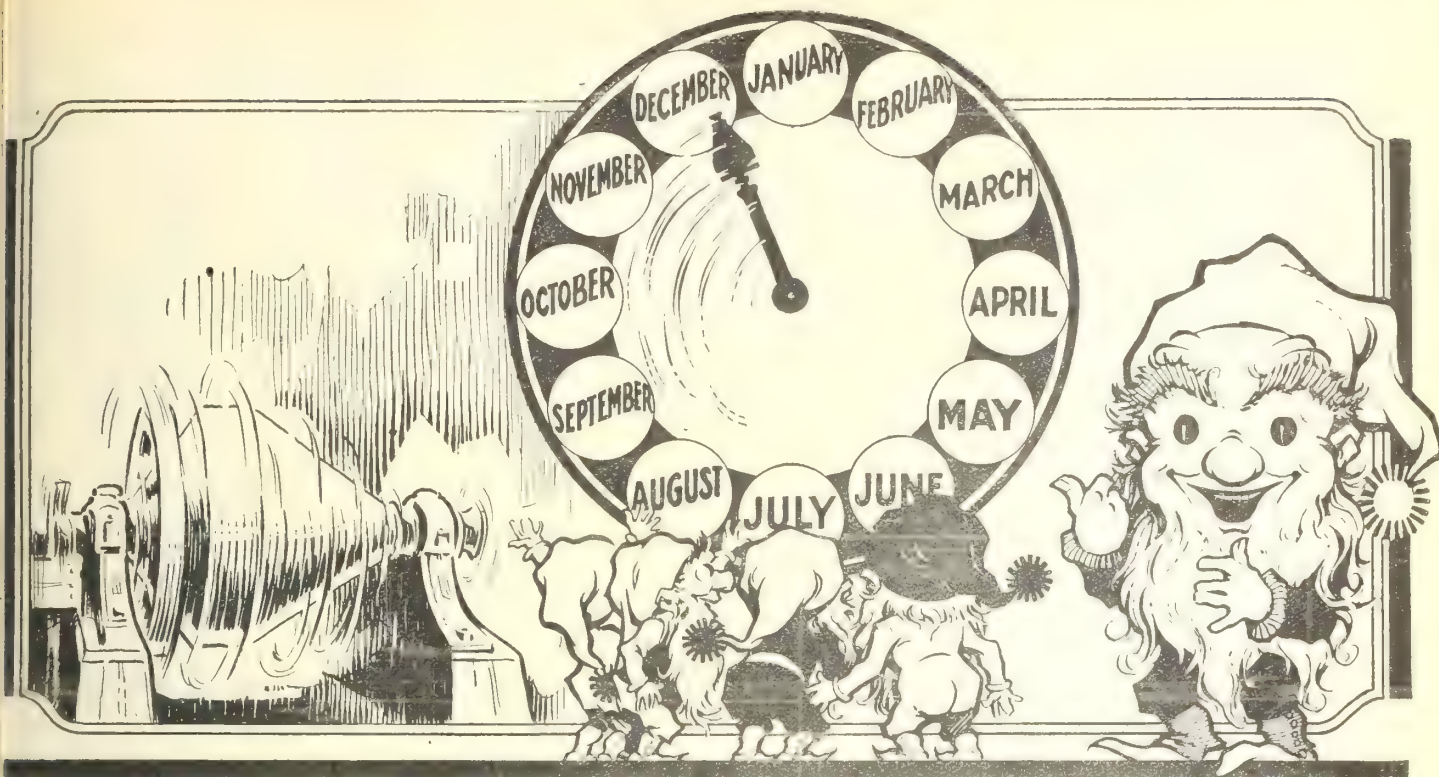


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- Analyses of Canadian Fuels. Parts I to V, by E. Stansfield M. Sc., and J. H. H. Nicolls, M. Sc.
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- Gas Producer Trials with Alberta Coals, by J. Blizard and E. S. Malloch.
- Summary Report of the Mines Branch, 1920.  
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- Applications for reports and particulars relative to having investigations made in the several laboratories should be addressed to The Director, Mines Branch, Department of Mines, Ottawa.
- Summary Report. The annual Summary Report of the Geological Survey is now printed in parts. Applicants should, therefore, state what particular geologist report is required, or what subject they are interested in.
- Memoir 108. The Mackenzie River Basin, by Charles Camsell and Wyatt Malcolm.

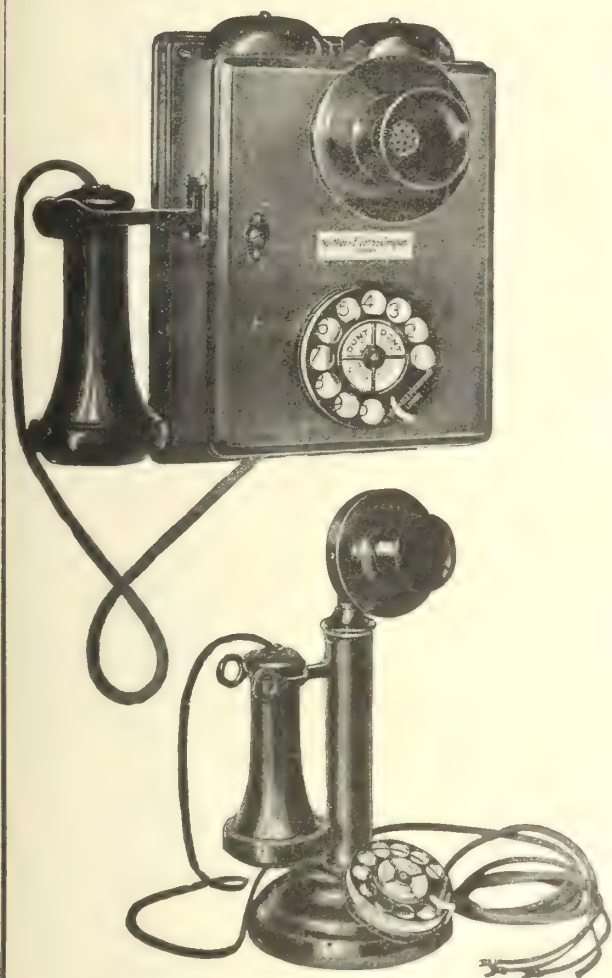
### GEOLOGICAL SURVEY

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- Map 1585. Mackenzie River basin, 1922 edition. Geology.
- Map 1751. Wainwright, Alberta. Topography.
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- Map 1754. Upper Elk and Highwood rivers, British Columbia and Alberta. Topography.
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# Ontario's



# Minerals

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DEPARTMENT OF MINES

HON H. MILLS, Minister of Mines

## Mineral Areas.

Ontario, with its 407,262 square miles, contains many millions of acres in which the geological formations are favorable for the occurrence of minerals, 70 per cent of the area being underlain by rocks of pre-Cambrian age. The phenomenally rich silver mines of Cobalt occur in these rocks; so also do the far-famed nickel-copper deposits of Sudbury, the gold of Porcupine and Kirkland Lake, and the iron ore of Magpie and Moose Mountain mines.

## Economic Minerals.

In addition to the above, practically all economic minerals (coal and tin excepted) are found in Ontario:—actinolite, apatite, arsenic, asbestos, cobalt, corundum, feldspar, fluor-spar, graphite, gypsum, iron pyrites, lead, mica, molybdenite, natural gas, palladium, petroleum, platinum, quartz, salt, talc and zinc. This Province has the largest deposits on the continent of talc, feldspar, mica and graphite.

Building materials, such as ornamental marble, limestone, sandstone, granite, trap, sand and gravel, lime, portland cement, brick and tile, meet every demand.

## Mineral Production.

Preliminary returns show the output of the mines and metallurgical works of the Province for the year 1921 to be worth \$48,128,387, of which the metallic production was \$27,574,202.

The following figures show the rapid growth of Ontario's mineral industry by five-year periods since 1891:

| Year.          | Value.      | Year.          | Value.       |
|----------------|-------------|----------------|--------------|
| 1891 . . . . . | \$4,705,672 | 1906 . . . . . | \$22,388,383 |
| 1896 . . . . . | 5,235,003   | 1911 . . . . . | 41,976,797   |
| 1901 . . . . . | 11,881,086  | 1916 . . . . . | 65,303,822   |

## Dividends.

Dividends and bonuses paid to the end of 1921 amounted to \$23,140,734 for gold mining companies, and \$84,388,185 for silver mining companies or a total of \$107,528,919.

## Mining Regulations.

A miner's license costs \$5.00 per annum, and entitles the holder to stake out in any or every mining division three claims of 40 acres each. After performing 200 days' assessment work on a claim, patent may be obtained from the Crown on payment of \$2.50 or \$3.00 per acre, depending on location in unsurveyed or surveyed territory.

## Assay Office.

The Provincial Assay Office at No. 5 Queen's Park, Toronto, is maintained by the Department of Mines for the free identification of minerals, free assays under the provisions of the Mining Act of Ontario, and also for general assay work as per the Schedule of Charges which may be obtained on application.

## Temiskaming Testing Laboratories

The Department maintains, at Cobalt, an ore sampling and testing laboratory which is now prepared to receive parcels of gold ore from 100 pounds upward, and after sampling and assaying the same to pay to the shipper the value thereof, less treatment charges. The purpose is to afford a market for ores extracted by prospectors and others in developing their mining claims, enabling them to obtain funds which they can use for further work and to report on the most satisfactory method of treatment. Fuller information may be obtained on application to the Manager, Temiskaming Testing Laboratories, Cobalt, Ontario.

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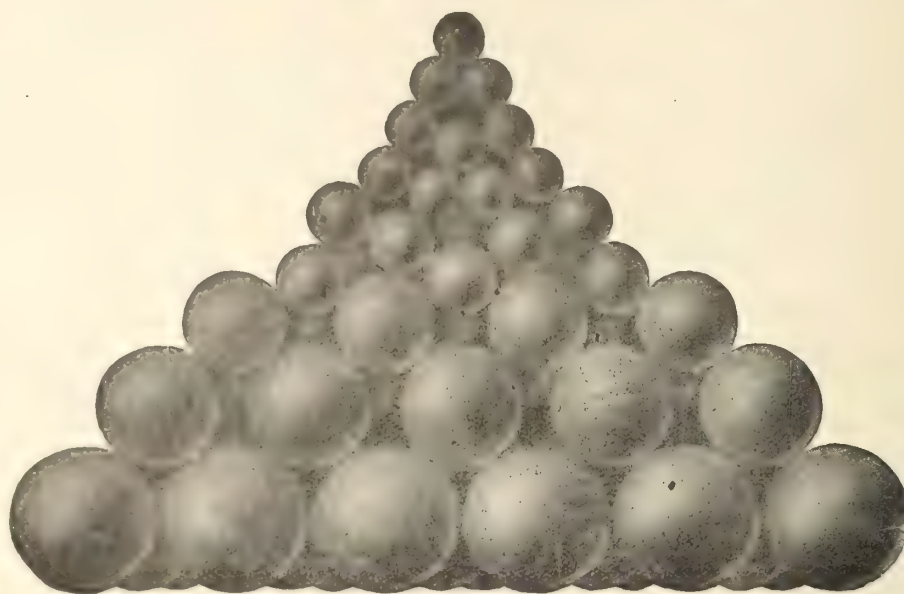
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to their progress in Canada*

VOL. XLIV

Gardenvale, Que., May 11th, 1923

No. 19

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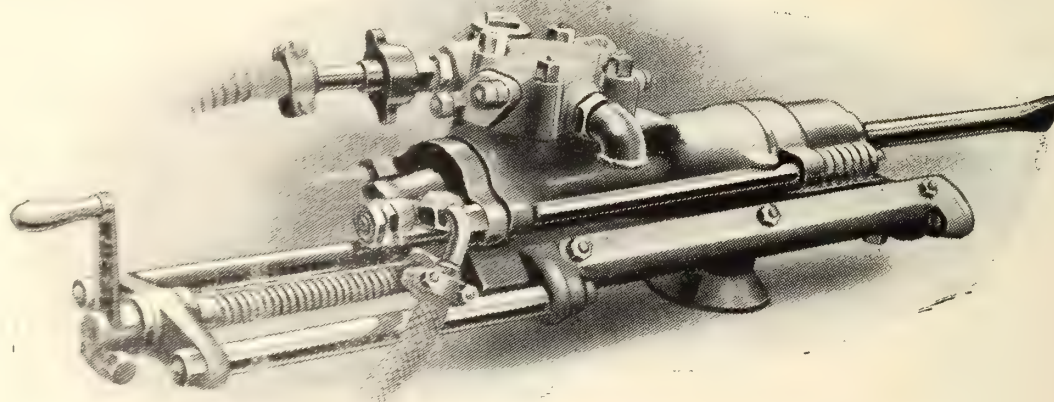


It is many years since The Imperial Bank of Canada, recognizing the importance of the Canadian mining industry and realizing the need of banking facilities for those engaged in its development, first opened a branch in Northern Ontario.

Since then the Imperial Bank's service has gradually extended until the mining interests in the rich area between North Bay and Hearst are now linked up by a complete chain of 12 branches.

This Bank's service to the mining industry is not confined to Northern Ontario alone. In all the mining areas throughout Canada the "Imperial" is rendering a valuable and complete financial service.

## IMPERIAL BANK OF CANADA



### HOLMAN "C.H.2" Cradle Hammer Drill BREAKS THE WORLD'S STOPING RECORD AT THE VAN RYN DEEP GOLD MINE

#### THESE ARE THE FACTS

This Record was achieved in Stope 3, East 9, Eastern Shaft, Van Ryn Deep Gold Mine.

September 2nd to October 1st, 1921.

Working Shifts 26.

Total Fathoms Broken 248

Stope width 69 ins.

Type of Drill — "Holman" Cradle Hammer (C.H.2)

Number of Machines 3

Machine Shifts 78.

Fathoms per Machine Shift 3.18

Contractor: B. T. Lellyett

Equipped with "4810" Air Hose

Manufactured by

**HOLMAN BROS. LIMITED**

**CAMBORNE, ENGLAND**

Distributors for Canada

**ALFRED HERBERT, LIMITED**

**1-3 JARVIS STREET, TORONTO**

Local Agents:

J. P. Bartleman, Timmins

R. P. Ross & Co., Sudbury

Frank Cassie, Cobalt

J. N. Bell Co., 507 London Bldg., Vancouver

# :-: EDITORIAL :-:

## THE FREIGHT RATE ON COAL

Sir Henry Thornton has announced that the Canadian National Railways will give an average rate of \$9 a ton on coal from Alberta to points in Ontario. This is a reduction of \$3.70 a ton from the rates heretofore in force. Mr. Howard Stutchbury, representative of the Alberta government on the question of western coal for Ontario, states that only with a rate of \$6.00 a ton can Alberta coal compete in Toronto with that from the United States.

We would judge that Sir Henry Thornton's announcement marks the first stage of a "dicker". He has specified wisely that no freight rate on coal from Alberta to Ontario shall entail an operating loss for the railway under his control. With this there can be no serious disagreement. The final point will be to determine what the operating cost is. This is still to an appreciable extent a matter of conjecture. Sir Henry Thornton is "playing safe" by putting the rate at the comparatively high figure of \$9.00—a rate that nevertheless seems very reasonable under the known circumstances.

In evidence before the Senate Committee on Fuel last week, Mr. M. J. Butler repeated the calculations he had made formerly, which were quoted at the annual meeting of the Canadian Institute of Mining and Metallurgy in Montreal last March. He says that, with cars and engines constructed for the purpose, train-loads of coal carrying 5000 tons can be hauled profitably over our Transcontinental line, with its maximum grade of four tenths of one per cent, for \$3.50 a ton from the mines to Cochrane, a distance of 1,750 miles. This corresponds with \$4.40 a ton to Toronto; but the grades from Cochrane to Toronto are not so favourable, and an allowance must be made for the added expense involved. Considering that Sir Henry Thornton's figure is based upon existing rolling-stock and present terminal facilities, obviously far below the standard of efficiency Mr. Butler specifies, the difference between the two rates is not hard to understand.

Besides the Canadian public, which has the largest interest at stake in this problem, there are three groups concerned — certain of the Alberta mine operators, the Canadian National Railways, and wholesale coal dealers in Ontario. The most favourable result to the public will be attained only if the conflicting interests of these groups are modified in accordance with a conclusion that will benefit all in the long run. The Canadian National Railways are the first to offer a concession, which we would judge may be substantially increased

if trial shipments show it is warranted, and which is most certainly capable of betterment if special equipment is provided. As these conditions for a still lower freight rate are contingent, the first upon trial shipments and the second upon steady shipment of coal from Alberta to Ontario, we would judge it to be well worth while for the miners of Alberta and the coal dealers of Ontario to accept Sir Henry Thornton's offer, with such additional concessions as he may be able to provide as a means of testing this possible solution of Canada's fuel problem.

## PROFESSIONAL BUSINESS PROPHETS

The number of vocations that arrogate to themselves the title of "profession" is continually being added to. The latest is probably that of the business prophet. Indeed, at no previous period in the world's history has anything like a tithe existed of the number of people who deem themselves fully qualified, with almost pontifical authority, to forecast business conditions.

This forecasting of future conditions, by means of diagrams or charts of the past, seems not only to have a strong fascination — and also, one imagines, a very profitable one — for those who practise it, but it also hits the taste of the general public. Few things, indeed, are more surprising than the way in which business men, big and small alike, seem ready to pin their faith to predictions based on these diagrams and charts. And this in spite of the fact that the predictions in question have an awkward way of being falsified, more often than they are ratified, by events.

"The worst of great thinkers," once said John Bright, "is that they generally think wrong." The forecaster of business conditions — the diagrammist and chartist — has this, at least, in common with the "great thinkers" of whom Bright spoke — he is generally wrong. Not invariably, of course. Not everyone who essays to forecast conditions in the matter of a horse race loses his money. People have been known, ere now, to break the bank at Monte Carlo. And just as the "plunger" who backs a "certainty", or the gambler with an "infallible system" sometimes guesses right, so, too, does the business "tipster."

But, it may be said, the business forecaster has his data to go on — his records of financial, commercial and industrial conditions in the past. Well, so has the race-course punter his "racing form"; and the "system" of the sportsman who essays to "break the bank" is not infrequently based on some more or less murky



lore regarding the ratio of the number of ways in which a particular event may occur to the number of ways in which it may not occur.

The truth of it is that the business forecaster with his diagrams and charts and his learned talk about "cycles" and all the rest of his professional paraphernalia is up against one supreme and, to our thinking, insurmountable difficulty. In predicting that a period of prosperity will be followed by a period of depression he is on sure ground. But, when he attempts to measure with any approximate accuracy the length of any given period of business prosperity or business depression, he encounters the difficulty of which we are thinking. Charts of these business conditions in the past would be helpful enough as a guide to the future if only those who put them forward as such could ensure that the determining factors to confront us in any given future period would be precisely the same as those encountered at a given period in the past. That, of course, they cannot do. And if the causes—that is to say, the determining factors—differ, the effect cannot be predicated to be the same.

This is not to say that existent conditions should not be analyzed or that attention should not be paid to symptoms. But the theory of periodicity in the alterations between prosperous times and times of depression is, and must necessarily be, always liable to be upset by particular forces at work at a particular time. A chart of the past, before the war that was to end all war, for example, can be of little use as a guide to the future to the world in its inflammable state today. For our part we believe in letting the forecaster's charts and diagrams alone, and devoting the time and energy which are required for their study to the work that needs doing now, leaving the future with its "cycles" to take care of itself.

#### USEFUL EXCURSIONS FOR M. P'S.

To the generality of Canadians the mineral industry of their country is little but a phrase, illustrated principally by flaunting advertisements in the daily papers soliciting subscriptions to doubtful mining stocks. Our representatives in Parliament are, with few exceptions, almost as ignorant of the facts of this great basic industry.

There was illustrated last week a potent means of informing the members of Parliament about our natural resources, and through them, their constituents. Senator Smeaton White of Montreal entertained a party of senators and members of the House of Commons in Shawinigan, Grand'Mere and Three Rivers, where they inspected the water power development and the industrial plants based upon the hydro-electric power. Most of the members of the party were from the West. All were informed at first hand of the facts about one of the East's most promising industrial centres.

This means of spreading abroad throughout the land authentic information about our resources might well be applied to the mining industry. Ottawa has within convenient range the asbestos district of Quebec, the Sudbury nickel deposits, the silver mines of Cobalt, and the gold mines of Porcupine and Kirkland Lake. The mining, milling, smelting and refining operations of all these camps can be made comprehensible to non-technical men. Their importance to Canada can best be impressed by a view of the industries they have created.

There are in Ottawa public representatives interested in the mineral industry in the same way that Senator White is interested in the industrial activities of the St. Maurice valley. Would it not be worth their while to co-operate with authorities in the mining camps with a view to arranging similar excursions of parliamentary representatives?

#### THE BRITISH EMPIRE EXHIBITION

Plans are maturing rapidly for Canada's participation in the great British Empire Exhibition to be held in London next year during the six months from April to October. Our national government has been very slow in deciding on Canada's share in this huge enterprise; but we can now be confident that out of their mature deliberation will proceed a plan of operations worthy of the principal British Dominion.

Canada's national exhibit will be housed in a building with 124,500 square feet of floor space, 415 feet long and 300 feet wide, and will be financed and controlled exclusively by the Federal Government. Our two great railway systems will have each a separate building for their own purposes. The Canadian building will exhibit the resources and products of each of the nine provinces and two territories.

Many are the problems of Empire. The present Exhibition is designed expressly for the purpose of promoting trade within our empire. The bonds that have knit into a political unit the scattered lands that call themselves British have been to a great extent engendered and strengthened by trade and commerce with the mother land. Of recent years these bonds have become loosened, with grave danger to us all. Many students of affairs have pointed out the present unrivalled opportunities for inter-imperial intercourse to the common benefit of all. The British Empire Exhibition is a practical attempt, on a vast scale, to put these opportunities to the test.

Seventy-two years ago the first of the great Empire exhibitions, that of 1851, was held in London, and the famous Crystal Palace still reminds the Londoner of its success. The "Exhibition of 1851" scholarships for students in science, awarded annually in all the British Dominions, were endowed by surplus funds from the exhibition and are a permanent and striking memorial of its financial success. We cannot hope for a direct monetary return from the present imperial un-



dertaking; but the final results from the intercourse of millions of Britons from all quarters of the globe in Wembley Park during the summer of 1924 are sure to measure up to the opportunity the Exhibition is designed to meet.

### WELCOME, GRADUATES OF 1923!

During this month the 1923 graduates in mining and metallurgy of our various universities will launch forth into their professional careers as engineers. The numbers this year will be large, on account of the numbers that were prevented from commencing their courses of study during the war years and entered the universities in 1919. Fortunately our mining and metallurgical industries are now so active that they are quite capable of absorbing these recruits and making good use of them.

It is characteristic of the Canadian student of engineering in our universities to employ himself seriously on a "job" connected with his future professional work during his summer vacations. Many, indeed, come to the universities only after they have found from practical experience that they can improve their professional prospects by further intra-mural study. Hence the task that devolves upon the older engineer, established in his practise, of welcoming and assisting his young confrère is made more pleasant and easier. There are few mines or mills in Canada today where the young graduate does not receive a cordial welcome, and in most the manager will even stretch a point to provide him with employment and give him a start. This is in marked contrast to the prevalent spirit twenty-five years ago, when the young college graduate acquired a vernacular and a good stock of cuss-words and chewed tobacco even to the point of sickness in an attempt to conceal the fact of his scholastic training.

The "Canadian Mining Journal" welcomes the addition to the fraternity of the 1923 graduates in mining and metallurgy, and hopes that the success of their budding professional careers will match the sure progress of Canada's mineral industry.

The gold vein on the Powell claim of the Noranda Mining Company in Rouyn township, Quebec, was well described in the "Northern Miner" recently by Mr. P. E. Hopkins, of the Department of Mines, Toronto, who visited the property just before the break-up. Mr. Hopkins, who is familiar with all the active gold properties in Ontario, thinks very highly of the Noranda vein after his inspection. "Noranda" is, by the way, a contraction for "Northern Canada", — not the name of somebody's best girl!

More than one attempt is under way to utilize the bituminous material contained in the vast deposits of "tar sands" on the Athabaska River. A serviceable asphalt pavement in Edmonton attests the utility of the sand in aiding the movement for good roads; but its

commercial use is feasible only if the valuable bituminous constituents are extracted for shipment.

The report that Mr. W. P. Hinton is to erect at Fort McMurray a small plant for extracting this bituminous material and producing from it tar, oils and gasoline may be premature, but it is nevertheless interesting as indicating the present active interest in the problem.

The season has commenced once more. We do not refer to the season for prospecting, but to the fishing season — the open season for "suckers." Already the public are regaled with suggestions of "another Hollinger", coupled with an invitation to buy stock in the prodigy. It is "hardly believable so much gold exists in any one area", it is stated in half-inch, black-face type, while in small type, in a previous advertisement it is stated that the estimated ore disclosed is 36,857 tons, of an average value of \$9.77. Luckily the Sale of Securities Act is now safely through the Ontario Legislature, and we may hope for a perpetual close season for "come on" advertisements for mining stock in that province at least.

An article by Mr. Jules Descamps in the "Revue de Paris" describes the way in which the German Mark is being replaced by various methods of calculating values. Industrialists, for instance, find it advantageous to pay wages to some extent at least in kind, and leases and property change hands in prices calculated in goods. A quintal of coal is regarded as a currency unit in Hanover and Westphalia, whilst Oldenburg and Mecklenburg-Schwerin issue bonds reckoned in barley. He considers that these diversions from the use of the Mark as money are but temporary expedients on the way to the adoption of a new gold standard, and that during the period of transition wholesale bankruptcies and other disastrous economic consequences may arise.

### LAKE FORTUNE PROPERTY OPTIONED

The property of the Lake Fortune Mining Company, Limited, in Boischatel township, northwestern Quebec, is now held under option by Messrs. A. A. Mackay and W. P. Alderson of Montreal. The terms of the agreement are coöperative, involving an option on the stock of the present company, and Messrs. Mackay and Alderson are allowed until July 1st. to examine the property, free of any obligation, before exercising their option. This examination will be commenced immediately travel is possible on Lake Opasatika.

In his recent article on the Quebec gold field, Dr. H. C. Cooke makes some interesting references to the property of the Lake Fortune Mining Company. "The Lake Fortune deposit occurs in a belt of highly schistose basalt that runs slightly north of east and has clearly been formed by faulting . . . . . Porphyry dikes are found on the property of the Lake Fortune Mining Company, and mineralization is most intense close to the dikes, dying away with increasing distance from them."



## Playing the Great Woods Game - II

### THE FIND

BY TOM SAVILLE

Toronto University,  
November 1st,—

Hudson's Bay Bill,  
Muskeg-Gogama,  
Ontario

Hello Bill! You will be glad to hear that we made good in our prospecting. We had a great summer, and we learned lots of things, camping out in the woods, that we might have lived and died in the city and never got wise to.

But about our prospecting; we acted on your suggestion and dropped off at Kirkland Lake on our way up to Cochrane, where we planned to take the Canadian National for La Salle and go into Quebec. We were very agreeably surprised at the courtesy and kindness shown us at the mines when they learned we were prospectors. They seemed to take a special interest in us, and pointed out the different rock formation and the general characteristics of the camp. We got a good look at your friend the Timiskaming conglomerate, and took particular note of it, especially the pebbles of red and black jasper. We also took particular notice of the feldspar porphyry, the syenite and those lamprophyre dikes, and altogether we came away from Kirkland Lake very much encouraged by the mining men and keen to dig up another camp like it.

We took the train again, intending to go straight through to Cochrane, but were prevailed upon by a friend at the Hollinger Mine to run into Porcupine and give the camp the once over. There we were dined and wine and fussed over and shown through the camp and we were made to feel that a prospector is considered "some fellow" in the North. We were shown around the contacts of those two big canoe-shaped intrusions of quartz porphyry into the basalt, with Hollinger Mine on one side and McIntyre on the other. Then we were taken over to the Dome and again saw where the porphyry had acted kindly by kicking into the Timiskaming and depositing a few dimes and nickels.

We came out of Porcupine with the feeling that we were especially anointed and appointed to go forth into the wilderness and pull the moss off another Dome or Hollinger, and for that reason instead of following the crowd into Rouyn district Quebec, we had the National train stop and put us off where we figured the Rouyn belt crossed the railway, and worked in from there.

Well, we might have been mistaken for the Babes in the Woods for the first few days,—but only for the first six, for on the seventh day, my pardner and I could wash a shirt, pound up and pan, or bake a bannock like any other old timer.

We worked along the belt, moving camp about once a week. But the summer was well on before we began to get action, although several times we had false alarms rung in on us. One time we ran into an ideal geological condition for gold—shear zones, porphyry intrusions, Timiskaming conglomerate—lots of life—and my pardner and I had visions of another Hollinger or Dome. But with all the indications pointing right, there was no gold, and that little adventure cost us about a month to work it out.

So we moved further along the belt. We had lots of room, and we were beginning to feel like Robinson Crusoe

and Bill Friday. We hadn't seen a soul outside a couple of timber cruisers who had camped with us overnight down on the northeast arm of False Alarm lake.

My diary says that it was on a Tuesday, and Nature was singing "The Last Rose of Summer." My pardner and I were beginning to have visions of a hard winter—our grubstake was all shot to pieces. We had moved camp a few days before to a little lake that we had to cut portages to and that we had named Dream Lake. We had come into camp one night, tired and hungry as a couple of bear cubs, and I mixed up a bannock for supper that was a little "raw," and that night my pardner dreamt that he had feet of clay, and that his hands were kneading golden dough. He told me this and when I started to laugh he wanted to lock horns with me,—and him usually so good natured. It sure had made an impression on him, and I began to think it time we were getting back to civilization; he might get worse.

"Yes," he told me, "you may laugh at my dream, but there's something to it, Alf, and I'll know the place if ever we come to it. Why, I have that little lake pictured in my mind like a photograph. I can see the creek running into it from the West, and a big spruce swamp behind. I can see some low, woody, ridges rising to the south and I can still see that big black bear, backing me off the cliff and as I slide, pulling the roots up here and tearing the moss off there. I land up against a shear zone running through the draw, and just as I'm wading into a real gold camp, you have the indecency to wake me and tell me it's my turn to light the fire—and it raining!"

Well, to get on with my story, as I said before it was a Tuesday. The day before, we had taken our tarpaulin for a lean-to, a blanket apiece and enough grub for overnight, intending to scout around the south. We were in a country that had never been travelled except for an occasional Redman, who had put in an odd blaze where he had set deadfalls for fisher and marten and an odd snare for a bear or lynx. We hadn't seen much to interest us in the way of rocks and we were on our way back to where we had left the tent on Dream Lake, travelling a different route from the one we came. My pardner was going ahead carrying the pack and the axe, cutting an odd little tree out of our way. I was coming behind with the canoe.

Suddenly he stopped and looked around. Then he turns to me, and says, "When did we pass here, Alf?" I tell him we have never been here in our lives, and just for fun I say "but maybe this is where you were in your dreams, the night you ate that raw bannock!" "Looks like the place," he answers, with never a smile.

Soon after, we see the shimmering of water through the trees and we are glad to get into the canoe and paddle for a change. We are a little better than half way up the points to the cliff at the end of the Lake, and tells me, that's where he had the argument with the black bear. I happen to look over to the west and sure enough, there's a little creek coming in and a big black spruce swamp behind it.

We land where we think is the best place to take through the woods for our camp, which must be close by.



I am busying myself fixing the paddles and the tumpline, getting ready to pack the canoe. As the sun is getting low, my pardner has taken his axe and his prospecting pick as soon as we landed and headed for a low-lying hog'sback, to the side of the draw.

"Alf!" I hear him call me, "come over here. Bring the gold pan with you." I get the pan out of his pack, and am soon over to where he is digging in like a ground-hog, the moss, sand and rusty schist flying in all directions.

"This stuff looks like it should carry," he tells me. "Look how decomposed this quartz and schist is, and there's that green stuff we seen in Porcupine, and them sulphides—see how fine they are." And with that he takes the pan and fills it full of that loose, rusty, decomposed schist and quartz and goes down to the water to pan it, while I take a walk around to look at the formation.

I soon see we are on a shear-zone—but we have seen shear zones before this summer, and all dead ones at that. I walk a little piece farther and pull off the moss from an outcrop of quartz porphyry, and I soon see there is some volume to it, and just as I am tearing the moss off some conglomerate—the Timiskaming kind, with the red and black jasper pebbles in it—I hear my pardner shout, "Alf, come over here!"—and the way he says it, I know he has struck something. In about two hops, steps and a jump I am with him and looking into the gold pan, and I don't need the little magnifying glass to see a tail of considerable fine gold and some fairly coarse nuggets trailing behind.

Neither of us says a word; we just shake hands which means more. Finally, my pardner suggests putting up a discovery post, and as it is getting towards sunset, we figure we had better head for our camp before it gets dark.

As there is no trail and we don't know for sure just how far it is to Dream Lake, we put in an odd blaze as we go, and we have the setting sun to guide us. Just as he goes down, we see the prettiest of pictures, which I venture to say, Bill, has looked good to you many's the time when you were packing through the woods with no trail a lake. This lake is our own Dream Lake and our camp is just round the point, and to tell the truth, Bill, we done some great dreaming round our camp-fire that night.

The next morning we started in to size up the country close around the discovery. We felt we were pretty safe from being stampeded, away back there. We made sure we were getting the "heart" of the "break" before we ran a line, and then we staked a claim each—four hundred acres—which we figured would make a good enough proposition for any big operating outfit if it was any good at all.

Well, we spent about a week, staking, running picket lines and blazing well our lines, making good posts and taking no chances on some tinhorn making trouble for us by filing a dispute. We also uncovered in several other places, "showings."

About this time our grubstake was all in, so we beat it out to record, taking a few grab samples with us.

Well, we got outside and secured our claims, and that night at the hotel we met the field engineer for the Pioneer Exploration Company of London, England. We gave him a working option on our claims for one year for one hundred thousand dollars each. At the end of the first six months if they decide to go ahead, we will each receive our first payment of ten thousand dollars, and the balance will be spread over a period of two years.

How's that for the first attempt, Bill? Hoping you have had just as good as summer as your friends,

A. Hustler and Will Makegood.

## NEW GENERAL MANAGER OF BRITISH AMERICA NICKEL CORPORATION

In the re-organization of the British America Nickel Corporation that preceded the recent resumption of operations at its various plants, there have been a number of changes of personnel. Senator E. N. Rhodes, who was formerly President and Managing Director, is now President and chairman of the Board of Directors. The position of Managing Director has been abolished. Mr. E. J. Carlyle has resigned from his position as manager of the smelter at Nickelton. Mr. Charles A. Rose has been appointed General Manager. As Mr. Rose is not so generally known in Canada as in his native country, the United States, a brief resumé of his professional experience will interest the "Journal's" readers.



CHARLES A. ROSE

Mr. Rose was born in 1879, and at the age of twenty-three graduated from the University of Nebraska as Bachelor of Science. He engaged immediately in chemical and metallurgical practice, which he has followed ever since. His first position was as chemist and mill superintendent for the Alder Creek Gold Mining Company in South Dakota, which he held for two years. He then spent six years as chief chemist of the Boston and Colorado Smelting Company in Denver, and after that, two years as metallurgical engineer with the American Smelting and Refining Company. From 1911 to 1916 Mr. Rose worked on



the development of the Chuquicamata plant of the Chile Exploration Company, as assistant to the consulting engineer, being immediately in charge of the experimental operations. In 1916 he was appointed consulting metallurgical engineer to the Guggenheim Brothers, the Chile Exploration Company and the Braden Copper Company, a position he still holds. At the same time he was appointed assistant to Mr. E. A. Cappelen Smith, Vice-president of the above Companies, which position he left to accept his present appointment.

Mr. Rose comes to Canada to apply commercially a metallurgical process that has wonderful possibilities, some of which have been demonstrated with very hopeful effect during the research work of recent years. The ore he must use is, however, not so rich as that of the two competing companies, and it will require all the skill he has developed during his years as a successful metallurgist and administrator to overcome this inherent difficulty. His temerity in tackling this task is admirable, and the "Journal" wishes him a full measure of success.

### LETTERS FROM READERS

#### Mr. Ledoux Exposes False Statement about Labrador Gold

To the Editor,  
Canadian Mining Journal,

Sir,

Mr. Lloyd Roberts, under date of "Ottawa, May 5th," has sent to the New York World a communication about Labrador gold which appeared on the front page of the World's news section yesterday. There are several columns about this alleged discovery of gold in Labrador, illustrated by a map and by photographs. It is intimated in the article that there are at least 100,000 men who are waiting an opportunity to rush into that region and locate claims on the basis of the discovery by Henry C. Bellew and Richard W. Edwards of very rich gold in a certain stream. The World publishes, on the strength of Mr. Roberts' statement, an alleged certificate of Ledoux & Co. date August 19, 1921, in which Ledoux & Co. are made to certify that we extracted 5 ozs. of gold from 25 lbs. of Labrador gravels; that we gave to Mr. Bellew or Mr. Edwards \$78 in payment for the gold after deducting our charges.

I write to say that Ledoux & Co. never made this assay nor did we ever receive any such sample from Mr. Edwards or Mr. Bellew or anyone else, and that, in so far as connecting our name and a certificate alleged to be signed by us with this assay is concerned, the statements are untrue. We have been besieged by people from Canada and the United States with inquiries as to the correctness of this statement and in each case have told the facts, but this does not overtake the advertisements circulated by the promoters and others, as evidenced by Mr. Roberts repeating the erroneous statement in the Sunday World of yesterday.

We have seen both Mr. Bellew and Mr. Edwards and they have admitted to us that neither of them ever received such an assay from Ledoux & Co. They claim that the sample was assayed for them by somebody else and that it was "an error" to couple our name with it. We have asked the company promoting the chief enterprise in that section to cease using this false report, but apparently it is difficult to bring about.

We do not know whether there is any gold in that section or not, and would not intimate that there is no gold there, but feel that it should be publicly known that, in so far as investments and the rush of prospectors have been influenced or may be influenced by a statement that Ledoux & Co. have assayed such a sample, the truth should be known.

A. R. Ledoux,  
President of Ledoux & Co.

New York,  
May 7th, 1923.

### LIFE SENTENCE SUGGESTED!

When a high official of a company organized to demonstrate another of those "greatest placer fields" intimates that an alleged discoverer of at least a portion of those placers might properly be "associated" with "some other person serving a life sentence", it is in order to keep your ear to the ground.

Something has happened! Recent developments admittedly impelled the official quoted to express his sentiments.

Meanwhile a veteran mining man, who actually visited the placers and who is identified with another company that makes no preposterous claims, had an experience. Hearing of a pretentious office on St. Catherine street, Montreal, where a window bestrewn with dollars bills typified only the initial output of the placers, he quietly sauntered in and displayed the keenest interest. He was assured that Monte Cristo and Colonel Sellers were "pikers" in comparison with the men who found and who hold these very placers. Incidentally he was handed a report on the placers—over his own name.

"Do you know this Engineer who made that report?" inquired the florid visitor.

"Oh, yes", rejoined the glib salesman.

Explanations ensued—with expletives. The Engineer demanded that the faked report be suppressed. And yet the "life sentence" remains in suspension.

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This unauthorized use and abuse of a report upon the placers obtained by a reputable Montreal Stock Exchange firm is deserving of exposure. The report dealt with the situation as it is; traces of placer gold at various points warrant the thorough tests contemplated.

The Stock Exchange firm, having acquired extensive areas, seemingly well-located, is about to send a fully-equipped expedition to the field. No nuggets from the Klondike or elsewhere have been dangled before a gaping crowd.

The firm sent a mining man and he says he found placer gold at various points. How great is the alluvial area, is something to be determined, as well as the average value. The Montreal Stock Exchange firm has indulged in no flights of fancy. What funds they have sought will be devoted to those determinations so necessary in order to prove whether the placers are isolated patches or at all consistent over a large acreage. So, the rebuke administered by the mining man who reported for the firm might well have received a measure of publicity comparable with some of the advertisements forecasting possible millions or billions—but within the law in the event of failure. Premier Taschereau has an opportunity to make an example of someone.—Alexander Gray.



# The Mine Explosion at Cumberland

CIGARETTE SMOKING RESPONSIBLE. RECOMMENDATIONS BY MR. WILKINSON

In his report on the explosion that took place on the 8th of February last in No. 4 Mine, Cumberland (Canadian Collieries (D) Ltd.), resulting in the loss of 33 lives, Mr. George Wilkinson, who was appointed to make a special investigation, describes in detail the underground conditions prior to the disaster, the occurrence itself, the efforts made at rescue and the experiences of those who engaged in this work, gives his opinion of the probable cause of the outbreak and makes some recommendations of importance.

No. 4 Mine, it is said, is very extensive, having been in operation for twenty-five years, and consists of two haulage slopes, which converge at a point about 50 feet from the portal. The explosion was in No. 1 Slope "in what is known as No. 2 East Section, off No. 4 Slope, No. 15 West Level." The accident of the 30th August, 1922, in which 18 lives were lost, took place in No. 2 Slope.

## Ventilation

The ventillation of No. 4 Mine, it is stated, is maintained by two fans, each slope having a separate intake and return airway. For No. 2 Slope there is a Sullivan reversible double inlet fan, with a rated capacity of 180,000 cubic feet a minute against a six-inch water gauge. No. 2 slope is taken care of by a 108-inch double inlet reversible Sirocco fan, which, running at 250 revolutions a minute, has a rated capacity of 200,000 cubic feet of air a minute, against a 6-inch water gauge.

The actual quantity passing in No. 4 mine in January 1923, was 157,500 cubic feet of air a minute. The amount in the return in No. 1 slope was 79,000 cubic feet a minute. At the head of No. 4 slope, No. 15 west level, there was passing from the intake, 42,000 cubic feet a minute. This is divided in two splits, No. 1 split on the west side, in which there was passing 16,000 cubic feet a minute, and No. 2 split on the east side, through which there was passing 15,500 cubic feet a minute.

In describing conditions underground after the explosion, it is said that no damage was found until the overcast below No. 2 west level, No. 4 slope, was reached. This overcast is constructed of 10" x 10" beams, laid in mortar and cement, and reinforced with steel rails on the bottom, and in addition to the ends being supported by concrete walls, two bridge sticks of square timber are erected, one on each side of the track to support the span; these bridge sticks were knocked out by the force of the blast travelling up the slope, and the beams of which the side were constructed were dislodged, as though they had been shaken apart by the concussion. This overcast was not in use but had been built in preparation for changes to be made in the ventilation at a future date. There were four stoppings in the different roads in the vicinity of this overcast, and only one was damaged, which is taken to indicate that the force of the blast was well spent when it reached this point.

## Victims of Afterdamp

Five hundred feet further at No. 1 east counter-level, a stopping was destroyed. Sixty feet below this there was a cave which extended on the slope for 160 feet, and also continued into No. 4 west level for approximately 30 feet and into No. 2 east level, which is almost opposite No. 4 west level, for approximately 75 feet. At the inbye and of the 160 foot cave on the slope, there is a flat where a fault was encountered. On this flat a siding is made. On this siding a number of bodies were found, all having been overcome by afterdamp. These men had worked further down the slope and had travelled distances varying from 800 to 1100 feet.

No. 4 west level was caved to a point 30 feet from the end. At the entrance and partially under the cave two bodies were found. The level was caved in two other places, but beyond this there was no further damage. Here were found other victims of afterdamp. Mr. Wilkinson commends the devotion to duty of Messrs. A. W. Watson and James Pinfold, who led a number to safety, and later returned to assist in rescue work.

## Point of Origin of Explosion

Dealing with No. 2 east level off No. 4 slope, where the explosion originated, it is explained that the section at first was opened on the pillar and stall system; but about 400 feet in the coal got thinner, and the long wall system was adopted, four places being carried, which gave a length of face of approximately 170 feet. A barrier pillar varying from 50 to 70 feet of solid coal is left between this section and No. 1 east section. The cave on the slope extended into this level for 75 feet. There were evident signs of violence at the entrance, all cars having been carried forward by the blast and piled in a jumbled heap. A counter to the main slope was driven for some distance, and a heavy stopping built of 10" x 10" beams laid in mortar and cement was blown out and carried down the counter slope.

Under the heading, "deductions as to point or origin of the explosion", the report says: — "The lines of force and conditions found indicate the point of origin as being behind the pack wall of the rise side of No. 2 East Level. No men escaped out of this section. Survivors from all other parts give testimony that it did not originate in any of the other sections. A short review of the conditions existing in the sections prior to the explosion will support the theory that the rise side of No. 2 east Level was the point in that section where the explosion originated. Explosive gas had been found and reported on the rise side of this level, intermittently for over two weeks, and had existed there, practically steadily, for five days prior to the explosion. Evidence given at the coroner's inquest by the firebosses in charge of this section, if correct, would indicate that the amount of gas in this particular place at times assumed serious proportions."



### Explosive Gas Present

Extracts then are given from the evidence of firebosses as to the amount of gas in the section in question, and it is stated that "a careful perusal of this evidence indicates that for 16 hours prior to the time of entry of the shift during which the fatal explosion occurred, conditions in the immediate vicinity of the face of No. 2 East Level were not very good. The night shift fireboss states he found explosive gas seven or eight feet back from the face. He also admits firing a shot in this place, and he had not examined the place farther than the high side, where the men were working. He further states he did not know how far back the explosive gas extended, as he did not examine the place far enough back to ascertain the exact condition.

"The morning shift fireboss gives very conflicting evidence. First he states there was only a cap of gas; then he admits explosive gas was found eighteen inches from the roof, behind the cogs, twelve feet back from the face. In further cross examination he states he got explosive gas five and one half feet from the floor, and the place was nine feet high. This would give explosive gas three and one half feet down from the roof in the cavity. From a sifting down of this evidence it can almost be conceded that there was, on the average, a depth of approximately two and one half feet of explosive gas in the higher part of the roof line behind the cogs in No. 2 east Level on the morning shift prior to the explosion.

"Taking an average of two feet of depth at the cavity, and making calculations from the detail plan where this body of explosive gas would tail out on the level, there would be approximately two hundred and thirty six cubic feet of methane exclusive of any that may have existed in the vacancies in the packwall at the time the morning shift fireboss made his examination.

### Point of Origin of Explosion

It is on the return side of where this gas was reported that the body of a Chinaman, Jung Tow, was found, and all the lines of force of the explosive blast radiate from this point. After carefully reviewing all the conditions as found after the explosion and conditions prior to the explosion in this section and the circumstances surrounding the location of Jung Tow's body, I must conclude that the point of origin of this explosion was in the return airway from No. 2 east level, in the place where the body of Jung Tow was found.

Discussing the possible cause of ignition, Mr. Wilkinson eliminates naked lights, for none was used; the firing of shots, for none was fired for some time prior to the blast, and also the possibility of an electric spark, as there was no such power within 500 feet of the face or within 640 feet of the point of origin of the explosion. He says that the most striking feature in No. 2 East Level, in the search for a possible source of ignition, is the location of Jung Tow's body. This was the last body recovered. In this connection the report continued.

### Smoking Caused Explosion

"There can be no legitimate reason advanced for his being where he was found. He was right in the return airway on the high side of the packwall, and also on the return side of the accumulation of explosive gas reported. There was absolutely no reason why he should be there, except for some illegitimate purpose,

and it is just the place where it would be expected to find a person who had some illegitimate act in mind, such as smoking, as he was in a place where no one except the fireboss could be expected. The fireboss or any other person entering the level would come along the roadway, and Jung Tow behind the pack would hear them as they went along the level and he would have ample warning of their approach. His position behind the pack wall and in the return was such that any smell of smoke would be carried into the old workings of No. 1, East section, where there would be no likelihood of detection. There was no incriminating evidence found on Jung Tow's body or by a cursory examination in the vicinity of the body; but the writer was so impressed with conditions observed surrounding this body that he requested that a thorough and diligent search among all the debris be made. In compliance with this request a gang of men were put at work to move and thoroughly search among all the debris. This was done by moving all the larger pieces and putting the smaller through a sieve, with the result that after three men had worked for two days and five men for three days, a match with just the head burn off and a piece of paper similar to a cigarette paper were found about ten feet from the body of Jung Tow.

"After the whole situation and circumstances surrounding this accident are reviewed, and careful thought given to every possible angle, indications are, that the cause of ignition was a match lighted for some illicit purpose, close to where the body of the Chinaman Jung Tow was found, in the return air from No. 2 East Level, and in the vicinity of where explosive gas was known to exist."

### Portable Gas Mask Recommended

In regard to mine rescue apparatus, it is pointed out that 19 out of the 33 who lost their lives succumbed from the effects of the afterdamp, some being within 70 feet of safety when overcome.

"It would appear", Mr. Wilkinson proceeds, "that if any large effectual life saving is to be done, it will have to be through some type of portable apparatus that can be carried around by a miner and donned quickly after an explosion occurs, in a manner similar to that employed by the soldiers at the front. An apparatus of this kind would be ineffective in an atmosphere where the oxygen content is completely destroyed or very low; but in the case of the escape of men from districts that have not been affected, except possibly by a limited quantity of smoke or afterdamp, it would be very effective. With some portable apparatus of this type, it is highly probable that 19 of these men would have escaped from this explosion, as no doubt the oxygen content was sufficient to sustain life. Good work is done by rescue crews equipped with a larger type of rescue apparatus. But by the time crews are organized and equipment transported to the scene of the accident, valuable time is lost, and employees who have been uninjured by the explosion rush out to try and reach safety, with the result that many are overcome by the deadly afterdamp. In rare cases rescue is effected where men have stayed in their working places or near the face."

It is given as an illustration that the men in the Cumberland accident who were overcome and lost their lives probably reached the place where they fell within five minutes after the blast; while to get the rescue ap-



paratus from the station, organize the crews, and reach this point, which was some  $2\frac{1}{2}$  miles underground, about two hours was required. If the portable mask, called the "Self Rescuer", which is now being thoroughly investigated by the Department of Mines, can be perfected and if it will last, say, for one hour in an atmosphere containing afterdamp but within sufficient oxygen to sustain life, a similar loss of life might be avoided. Mr. Wilkinson observes that the British Columbia Department of Mines is to be commended for its prompt action in investigating the possibilities of this mask.

### Fireboss' Reports not Complete

The investigator makes some strong comments on the reports of firebosses. He says that in most cases, the report will read "Explosive gas found, etc." No idea is given as to the quantity found. If a gas cap is found, the report will read "found gas cap, etc." No idea is given as to the size of the cap or the percentage of methane that may be travelling in the air. The report adds, "From the evidence given at the Inquest it is apparent that the officials actually in charge of operations at the faces do not give enough serious thought as to the danger of allowing miners to continue at work at the face when accumulations of explosive gas are present in the vicinity. This was brought out very plainly at the inquest by the cross-examination of the fireboss in charge of this district. The evidence of the fireboss on the morning shift would indicate that there was at least two hundred and thirty-six cubic feet of methane, the inner end of which was within twelve feet of the working face, when he visited No. 2 East Level on one of his rounds, yet he admits in his evidence that he allowed the men to remain at work. What the conditions were during the afternoon of the explosion unfortunately cannot be ascertained. It would seem advisable that in a place where conditions arise such as those in No. 2 East Level, no one but the most skilled and careful miners should be allowed to work.

"It has been already demonstrated both at this explosion and the one previous that small accumulations of explosive gas are very dangerous in this mine when working on the long-wall system, as no doubt the explosion is fed by gas drawn out of breaks in the roof, which are incapable of examination.

"If the evidence of the two firebosses as given by themselves at the inquest is to be credited, it is very apparent they are not making reports showing the actual conditions, and these reports are misleading to their superior officers. Some of them are not carrying out the provisions of the 'Coal Mines Regulation Act' at times regarding blasting. The night-shift fireboss admits in his evidence that he fired a shot on the high side of No. 2 East Level, at half-past four on the morning of the 8th February, and that after firing this shot he found explosive gas about twelve feet away, and he further admits he did not examine so far back before he fired the shot. The 'Coal Mines Regulation Act' requires that he shall examine all places contiguous thereto for a radius of twenty five yards."

### Smoking in the Mines

In regard to the carrying of matches and smoking material in coal mine workings, Mr. Wilkinson observes that a package of cigarette papers, two boxes of matches, and later a burnt match were found in the mine and during the time of rescue operations. One of the bodies was picked up by Inspector Jackson. Both,

however, were discovered at points that had no bearing on the explosion. There were two convictions against employees charged with having matches and smoking material in their possession in this mine during October and November, 1922. One received a sentence of 30 days and the other three months imprisonment with hard labour.

Mr. Wilkinson adds: — "The practice of employees taking matches and smoking material into the different mines in British Columbia is becoming so serious that some drastic measure will have to be taken to stamp it out. There were light convictions at the Cassidy mine, operated by the Granby Consolidated Mining and Smelting Company, during 1922, and the maximum penalty was a fine of ten dollars and costs. Six of these eight were caught on one day — the 10th November, 1922. In addition to these at Cassidy, there were the two mentioned at Cumberland, three at Coal Creek, and one at Nanaimo. When occasional searches result in finding so many miners carrying matches and smoking material, it is safe to assume that on the many that were not searched during the year there would be a great deal more of the same material carried."

### Stricter Enforcement of Law Advocated

The report then proceeds to give in statistical form figures of the prosecutions and penalties for the offense in question recorded during 1922. It is shown that in that period there were 14 convictions, one being against an oriental, one against a coloured man, and 12 against white men. In 1923 up to date, it is shown that there have been a number of serious offenses against the terms of the "Coal Mines Regulations Act", most of them having to do with the carrying of smoking material and matches while at work in a coal mine. Three orientals and eight whites were convicted. Special reference is made to the case of Louis Hadevis who was caught recently smoking underground at Lantzville, and whose conduct was investigated by Mr. W. H. Wall, the latter holding a commission under the Act. It has been recommended in this case that Hadevis' Coal Miner's Certificate of Competency be suspended for two years.

"From a perusal of the list of offences," Mr. Wilkinson says, "it would appear as though surprise searches should be made at frequent intervals and offenders prosecuted. The maximum pecuniary penalty allowed by the 'Coal Mines Regulation Act' is ten dollars for any other person than an owner, agent or manager. From this pecuniary penalty it jumps to imprisonment, if the Court is of the opinion that the case is one that was reasonably calculated to endanger the safety of the persons employed in or about the mine. The maximum pecuniary penalty allowed is too small for serious offences, and it would appear an amendment to the Act should be made fixing a higher pecuniary penalty, as a fine of from one to ten dollars seems almost to condone an offence. When the fact is considered that many lives may hinge on a single match in the hands of an ignorant or careless person, it would seem that provisions should be made for the infliction of stiffer pecuniary penalties."

### Minor Officials Negligent

Under "Safety Measures", Mr. Wilkinson continues: — "The Canadian Collieries employ a safety engineer, who is a First Class Certificated Colliery Manager with some twenty-seven years' experience in official capacities. His duties consist of making a monthly examination of all the mines and works operated by the



company and making a report direct to the General Superintendent on the conditions found and any recommendations he may have to make to safeguard operations. He has no other duties, his whole time being devoted to safety measures.

In addition to the safety engineer, there is an efficiency committee at each mine who make an examination of the underground works and report conditions found and make any recommendations they may have for further safeguarding operations. This efficiency committee is composed of workmen and is chosen by the employees of the mine, but it is paid by the company. There is also a gas committee appointed by the employees of the mine under the terms of General Rule 37, Coal Mines Regulation Act, to make an inspection of the mine on behalf of the workmen.

"The above-mentioned were all making regular inspection of the mine and posting reports. It seems deplorable that such an accident should occur when so much effort is expended by the management, in co-operation with the Mines Department officials, on safety measures; but these committees and the safety engineer, and also government inspectors, only see conditions as they are at the time of their examinations, and the fact remains that dangerous local conditions can arise in almost any mine in a short time, and it is really the official locally in charge of a portion of the mine where dangerous conditions may arise, and the workmen themselves actually working there, who can really safeguard operations the most and can apply safety measures by withdrawing from any dangers that may arise or by taking no risks when dangerous conditions exist. In a mine the size of this one, where it will take a person from three to four days to visit all the workings, there are times when the management must rely on subordinate officials assuming some responsibility, and they are dependent on the reports of these officials to keep them in touch with conditions. These officials, who are in touch with conditions at the faces daily, are the ones who can apply the real safety measures, coupled, of course, with the co-operation of the miners themselves. When a local official finds explosive gas and is so indifferent in his duties that he does not try to ascertain the extent of the gas and yet goes out and makes a report of what is supposed to be the true condition, or when he fires a shot without first making a proper examination of a place, he cannot be said to be carrying out safety measures in the spirit shown by his superior officers. The general safety operations can be taken care of by the management, but it is an utter impossibility for them to take care of all local contingencies that may arise. A careful checking up of the various reports made reveals the fact that explosive gas or even a trace of gas had been rarely found in No. 2 East Section until a short time prior to the expansion."

#### Recommendations

Mr. Wilkinson's concluding remarks and suggestions follow:—"The most of the accidents occurring in the coal mines of British Columbia are readily traceable to laxity or indifference on the part of the officials locally in charge of the workings, or to the employees themselves. It may be charitable to give verdicts of accidental death, misadventure, and error of judgment, but the fact remains that they could better

be classed as downright carelessness or indifference. With the object of eliminating to some extent the indifference and carelessness now displayed in the frequent violation of certain rules and regulations, I would respectfully recommend that: 'the Coal Mines Regulation Act' be amended to increase the maximum pecuniary penalty for violations, to one hundred dollars instead of ten dollars, as at present.

"I would further recommend that regulations be prepared and issued by the Department of Mines to standardize the form of fireboss reports, so that the conditions in regard to inflammable gas will be described by a compulsory statement, in cubic feet, of all explosive gas found; and that the length of gas caps to be stated in inches or fractions of an inch."—R. D.

#### INDUSTRIAL ITEMS.

Little Tugger Double Drum Hoists, designed especially for the operation of scrapers a "slushing" underground, are described in Bulletin 4056-C, just issued by the Canadian Ingersoll-Rand Company and available from them on request.

Mr. Vincent Woodbury has recently been appointed agent for the sale of the Ontario Wind Engine and Pump Company's products in Northern Ontario, where



VINCENT WOODBURY

there is a widening field for the materials the company can provide for the use of the mining industry.

Electric hoists and overhead travelling cranes are described in a new catalogue, No. 480, just published by the Link-Belt Company, and available on application to the Canadian Link-Belt Company, Toronto and Montreal. These hoists and cranes are eminently suited for use in metallurgical works and mills.



## Quebec's Gold Movement Has Substantial Leadership

By ALEXANDER GRAY

There is substance and international interest behind the Quebec gold movement. That may not mean, nor should it mean, the flotation of more companies than mining share markets can digest, along with what already is quoted. The very fact that wise capital and competent technical control have combined to prove the Quebec fields, and to do it quickly and quietly, is the more reason why it should not be assumed that every prospect is pleasing. Several properties have furnished preliminary evidence of real worth, both at depth and on the surface, widths and values so far as determined having confirmed the optimistic views of the original owners; consequently there is no doubting that this is Quebec's year. But still there is danger that missteps may confuse the issues and retard initial operations.

Doubtless the new Quebec field will survive in any event—there will be mines there. Kirkland Lake surmounted early indiscretions. The inactive areas of Porcupine and the more easterly sections have a past from which they are just beginning to recover. While it is not to be presumed that there will be no indiscriminate appeals to the public in the present case, the very fact that Quebec is in a position to profit by experiences in Northern Ontario sustains the impression that mischief will be minimized by the fact that a large part of the holdings is in the hands of experienced mining investors, well able to develop an outcrop to the producing stage.

It is deserving of repeated mention that Quebec has now the advantage of all the former studies in economic geology in the gold areas undergoing exploitation, and we have the assurance of outstanding authorities that the favourable rocks are strongly developed — more so, perhaps, than they are elsewhere. This has proved to be an attraction to discriminating mining investors.

### Indiscriminate Promotions to be Discouraged

Premier Taschereau has made it clear that over-speculation will be discouraged. His Government will endeavor to meet the transportation situation. The aim of Quebec is to secure and hold for Quebec the business resulting from developments. To that end certain influential bodies concur in the temporary arrangements for roads that will make the field more accessible. Canoe routes will serve as auxiliary avenues by which supplies can be taken in. Roads are essential for the heavier hauling. Combined land and water facilities from Ville-Marie and the Transcontinental railway are counted on to meet all present and prospective requirements. When developments are further along, a northern extension of the railway from Quinze lake is not unlikely.

To a certainty the Quebec Government will not neglect their rights and opportunities. Meanwhile a railway from the Temiskaming and Northern Ontario line will tap the Kirkland and Larder districts and will lessen the labor of getting in supplies from the Ontario side. Quebec will not hesitate about railway

transportation when the business offered demands railway facilities. Besides, the Des Quinze power development should serve to attract capital to the new mining field.

International capitalists are giving Quebec's gold fields a most auspicious start. London and New York are represented in the queue awaiting the break-up. Sentiment is decidedly more favourable than when Porcupine was being unceremoniously condemned and Kirkland ignored. Unscrupulous promotions will not hold the entire field in this case, as they have threatened to do on former occasions. Popular levies, as distinguished from private enterprises, have created very few genuine gold producers in the North Country. Closer organizations equipped with sufficient initial capital will hasten the establishment of the Quebec fields.

### The First Gold Prospects Now Revived

Dr. Cooke has defined the potential Quebec country as a "band about five miles wide north of the Keewatin-Temiskaming contact." Porphyry intrusions have been noted outside this prospecting area. Masses of favorable intrusives are known to exist in townships nearer to the Transcontinental railway than those dealt with by Dr. Cooke. The fracturing accompanies the intrusions. Appreciation of Quebec has been long-deferred since Mr. Obalski wrote in 1906:

"Near the height of land, at the head and east of Lake Opasatica, prospectors found a sample of very remarkable quartz, weighing several pounds and showing coarse gold. Some work was done which justified the purchase of two blocks of mining lands from the Government and fine samples of quartz, showing gold, were produced with the applications. The discovery was made by Messrs. Alphonse Ollier and Auguste Renaud, who purchased a block. A second block was bought by Mr. D. M. Morin who transferred it to the King of the North Gold Mines."

Montrealers predominated in those organizations. The pioneers had two lakes named after them. Lake Fortune was rather a misnomer, and the King of the North remained storm-bound. Latterly, however, responsible men have undertaken to unwater the Lake Fortune and to test thoroughly the workings, which are understood to have been in the basalt. The porphyry in that vicinity is known to carry values. What is in store for the King of the North remains to be seen, as the original owners are scattered and data scarce. The shear zones of that vicinity appealed to Dr. Cooke. They are extensive. Other shear zones in Boischatel and the mineralization observed, in conjunction with information from Rouyn township, confirm the judgment of Dr. Bancroft that the rocks should be fine-tooth-combed.

### Big Mining Interests in the New Field

They will be. Should those who have entertained the Lake Fortune Mine proceed, a local laboratory, similar to the Temiskaming Testing Laboratories at Cobalt, may be equipped, and would be a convenience.



Undoubtedly the holders of the Cockeram ground will have their own special facilities, for they are well able to meet every requirement and commitment. The same is true of the owners of the Powell areas. They have a temporary mining plant on the premises. Because of the apathy or antipathy of responsible Canadians, Americans are in control of the Cockeram and Powell, where values and widths thus far are very encouraging. Moreover, these Americans have had prolonged experience as executives in the mining industry. Their present reticence conveys its own meaning: they are "Missourians", but are eagerly seeking "more of the same, thank you." In the hands of these men the Cockeram-Powell line is safeguarded from premature explosion. They cannot mislead themselves and yet they were the first to assert "Quebec has a gold field." The La Rose company has a place in the popular zone. Crown Reserve did not accept the Lake Fortune, but it is in Rouyn township, along with its neighbors from Cobalt. Messrs. O'Brien and Williams are in the north-east corner of Rouyn and at Pancake lake with the Coniagas.

As for Boischatel, it is largely held by certain of the most influential factors in Canada. Last fall it was realized that the porphyries are well-defined in Boischatel and that the shear zones there are extensive. The porphyries were traced to the northeastern corner of the township, to the granite, and they have been located further north. One block of claims was staked straddling a porphyry mass that appeared to be approximately sixty chains in width. Ottawa and Sault Ste. Marie people hitched onto this large block, because of the shearing and geology as described by Dr. Cooke. The representative in the field of some of the principals in the Cockeram-Powell section has staked between the large block mentioned and the Lake Fortune-King of the North properties. Senator O'Brien's party is understood to have located next to the three-thousand-acre block and the Ottawa-"Soo" people. These respective interests are not contemplating immediate operations in share markets. They are entering upon a campaign of prospecting.

#### **Rapid Development Assured**

Evidence accumulates that London and New York will become more familiar with the Quebec country as developments proceed. Already there are inquiries from some of the mining groups. It is the participation of experienced mining capital from the States, and the acquisitions of the Coniagas, Crown Reserve and La Rose companies in Rouyn township that guarantees authentic information in the course of a few months. When Crown Reserve and the Coniagas went into the Pancake Lake district, they helped the Associated Goldfields of Larder Lake over the stile. Even Associated may win a credit mark, although the discussion at the recent annual meeting of the company, about making a market for some shares at 30 cents, hardly harmonizes with the official statement of "assets" and the nominal capitalization of \$30,000,000.

Primarily the decision in Quebec rests with the clusters of claims staked by the Cockerams, Powell, St. Louis, Horne, the Murrays, and others, in Rouyn township. These claims have passed into competent hands—Thomson and associates; Hammell and associates; O'Brien & Williams, Fred. Connell and associates; the Coniagas, La Rose and Crown Reserve. Central Boischatel township has a similar combination of interests.

The break-up is with us, and the starter is in the stand.

### **THE MOND PROCESS AND SOCIALISM**

In a debate in the British House of Commons recently on the socialisation of "the instruments of production and distribution," Mr. Philip Snowden referred incidentally to the case of chemical workers, and he received from Sir Alfred Mond a particularly effective reply. In contrast with Mr. Snowden's airy descriptions of the idle rich who live on the industry of the workers—based, we believe, on a purely academic acquaintance with the British workshop—Sir Alfred presented an instructive piece of actual industrial history in the following terms: "It is now nearly fifty years since two young men, with very little money, decided to start a new enterprise. Their capital was insufficient, but their optimism was very great. They adopted a process entirely unknown in this country. They asked people who knew the industry to come in, but could not induce anyone to share the risk. They struggled on, and they founded a concern that has given good wages and good conditions of labour for fifty years. Those young men were my father and Sir John Brunner. That enterprise could never have been commenced under any socialist system I have ever heard of." It is just that ambition which led Dr. Ludwig Mond and Sir John Brunner to found the great concern associated with their names which the socialist system so confidently recommended to us would kill. If private capital is to be abolished houses bought by the workers and the costly furs in which Labour M. P.'s wives now appear will have to be included in the "pool." When Sir Alfred reminded the House of this result the Labour members shouted "No." Of course. Socialise capital as much as you like so long as it is somebody else's capital. When wealthy Labour leaders set the example of sharing their possessions with their poorer brethren instead of always seeking to reform mankind at other people's expense, their doctrine of "all for each and each for all" may begin to sound more convincing.—The Chemical Age.

### **SPANISH FERTILISERS**

Preparations are in progress for the exploitation on a large scale of the potash deposits near Suria, in the Province of Lerida, Spain. A Belgian concern is now building an immense plant, which it is said, will have a productive capacity more than equal to the total Spanish consumption. The product is already being placed on the market, and it is thought that Spain will soon cease to import potash fertilisers if production in Lerida is increased as expected.

Experiments have been carried out at Caceres, in super-phosphate works belonging to the Union Espanola de Explosivos, for the purpose of determining what use can be made of the low-grade phosphates that are rather abundant in the Spanish deposits. If the results obtained in the laboratories are confirmed in practice, it is reported that several million tons more of this fertiliser will be made available for Spanish consumers.

It has been announced that producers of sulphur in the United States and Italy have agreed to fix the price of sulphur in concert from time to time; also to fix the annual production to that required by the world's market, and to delimit the markets of each in a general way.



# Mineral Production of British Columbia in 1922

FINAL FIGURES EXCEED PRELIMINARY  
ESTIMATES

The total value of minerals produced in British Columbia in the year 1922, according to the final revised figures issued by Hon. William Sloan, Minister of Mines, was \$35,158,843, compared with \$28,066,641 in the previous year, an increase of \$6,092,202, or approximately 25 per cent. With the exception of the years 1916, 1917, 1918 and 1920 the past year's output in point of value was the highest in the history of the industry in British Columbia, and is evidence of the increasing development of the mining industry in the Province.

A preliminary report issued at the end of the year indicated that the output would be valued at slightly over \$32,162,000, but the final figures showed this estimate was too modest.

The output of the various minerals and the value thereof in the years 1921 and 1922 show the growing importance of the industry. The comparisons follow:

effect of this movement has now become apparent in the disappearance of the surplus stocks of the metals and the revival of a demand market at a living price.

We now hear that some of these copper companies have prepared and others are preparing to start up again, which is a sign tending to optimism for the future of the copper market, which reached 14 cents during the opening months of 1923 approached 15 cents.

The copper output for 1922 was 32,359,896 pounds, valued at \$4,329,754, a decrease from last year's output and below the normal output of the Province. This is largely due to the fact that the mill of the Britannia Company, one of our largest producers, was burned in 1920, and the new mill, only now completed, was not available for operation during the year.

## Lead and Zinc

During the most of the year 1921 there was no demand for lead or zinc, and these metals in the refined

|                        |                 | Quantity.  | Value.       | Quantity.  | Value.       | Quantity.  | Value.       |
|------------------------|-----------------|------------|--------------|------------|--------------|------------|--------------|
|                        |                 | 1920.      |              | 1921.      |              | 1922.      |              |
| Gold Placer            | Ounces.         | 11,080     | \$ 221,600   | 11,660     | \$ 233,200   | 18,240     | \$ 364,800   |
| Gold Lode              | Ounces.         | 120,048    | 2,481,392    | 135,663    | 2,804,154    | 197,856    | 4,089,684    |
| Silver                 | Ounces.         | 3,377,849  | 3,235,980    | 2,673,389  | 1,591,201    | 7,101,311  | 4,554,781    |
| Copper                 | Pounds.         | 44,887,676 | 7,832,899    | 39,036,993 | 4,879,624    | 32,359,896 | 4,329,754    |
| Lead                   | Pounds.         | 39,331,218 | 2,816,115    | 41,402,288 | 1,693,354    | 67,447,985 | 3,480,316    |
| Zinc                   | Pounds.         | 47,208,268 | 3,077,979    | 49,419,372 | 1,952,065    | 57,146,548 | 2,777,322    |
| Coal                   | Tons, 2,240 lb. | 2,595,125  | 12,975,625   | 2,483,995  | 12,419,975   | 2,511,843  | 12,559,215   |
| Coke                   | Tons, 2,240 lb. | 67,792     | 474,544      | 59,434     | 416,038      | 45,835     | 320,845      |
| Miscellaneous products |                 |            | 2,426,950    |            | 2,077,030    |            | 2,682,126    |
|                        |                 |            | \$35,543,084 |            | \$28,066,641 |            | \$35,158,843 |

The report contains a mass of interesting statistical information, together with the reports of the various district mining engineers on their respective districts outlining progress of development work and prospects. It is most comprehensive and illustrated by many excellent illustrations.

In summarizing conditions during the past year it is said that the increasing production shows that normal conditions in the industry are returning and may be expected to remain. As Europe is still the chief metal market and consumer, industrial conditions there regulate consumption. In spite of unsettled conditions there, the demand is good, and with the reduction of stocks on this continent, which in 1921 was greatly overstocked, metal prices in 1922 have been materially higher than in 1920. For instance, in 1921, the average price for silver was 62.65 cents compared with 67.52 cents last year; for copper, 12.50 cents compared with 13.38; for lead, 4.54 cents as against 5.73; and for zinc 4.65 cents compared with 5.72.

## Copper

During the past year costs of mining, including wages and supplies, have been materially decreased, so that the outlook for the next year's mining is somewhat brighter, and a reasonable margin of profit seems to be assured to the producers. During 1921 all the copper producers of this continent, by concerted action, reduced their output to about 25 per cent, or shut down entirely, so as to reduce stocks of copper on hand. The

state accumulated at the Trail smelter to an extent that prohibited the further purchase of their ores by the custom smelters, from which cause many of the Sloean mines were shut down. During the latter part of the year the Trail smelter was fortunate in finding an outlet in the Orient for the greater part of its accumulated lead and zinc stocks, which again permitted prompt cash payment for ores of these metals to be made, and thus started up the mines in the Sloean, so that 1923 sees these properties working again on a normal basis.

In 1922 the output of lead was 67,447,985 lb., having a value of \$3,480,316, an increase of 26,045,697 lb., or 63 percent over 1921, chiefly due to renewed activity of the Sloean mines.

The production of zinc in 1922 was 57,146,548 lb., valued at \$2,777,322, a decided increase over even the preceding year, amounting to 2,727,1176 lb., or over 15 percent. The greater amount of this was mined at the Sullivan mine in East Kootenay and concentrated and refined at Trail.

## Coal

The collieries of British Columbia held their own, having made a net coal production of 2,511,843 tons (2,240 lbs.), as against 2,483,995 tons in 1921 an increase of 27,848 tons, equal to about 1.1 per cent. With the exception of the year 1920, the net coal output for 1922 is larger than any other year since 1912, or of any previous year except 1910. There was 4,435 tons of coke produced in the Coast District by the Collieries.



The Anyox smelter converted some coal into coke for their own use.

The Crow's Nest District produced 41,400 long tons of coke, of which about two-thirds was used in Canada and one third exported to the United States.

The aggregate of the values of British Columbia colliery products in 1922 was \$12,880,000, this being less than the gross value of this year's metalliferous products, \$19,596,657.

It is noteworthy that the Northwestern District produced 67.7 percent of the tonnage of ore mine in British Columbia in 1922, carrying about 55 percent of the total value of the metalliferous output of the Province.

### The Mining Districts

The following table shows the number of mines that shipped during the year 1922, the districts in which they are situated, and the tonnage produced in each district together with the number of men employed, both above ground and underground.

|                                                                                  | Tons of Ore Shipped. | No. of Mines shipping. | No. of Mines shipping over 100 tons in 1922. | Men employed in these Mines. |        |        |
|----------------------------------------------------------------------------------|----------------------|------------------------|----------------------------------------------|------------------------------|--------|--------|
|                                                                                  |                      |                        |                                              | Below.                       | Above. | Total. |
| <b>No. 1 District.</b>                                                           |                      |                        |                                              |                              |        |        |
| Atlin, Stikine, and Liard . . . . .                                              | 60                   | 3                      | ..                                           | 5                            | 6      | 11     |
| Nass River . . . . .                                                             | 857,373              | 3                      | 3                                            | 180                          | 98     | 278    |
| Portland Canal . . . . .                                                         | 102,343              | 3                      | 1                                            | 127                          | 182    | 309    |
| Skeena, Queen Charlotte, and Bella Coola . . . . .                               | 105,982              | 3                      | 1                                            | 143                          | 74     | 217    |
| <b>No. 2 District.</b>                                                           |                      |                        |                                              |                              |        |        |
| Cariboo and Quesnel . . . . .                                                    | ..                   | ..                     | ..                                           | ..                           | ..     | ..     |
| Omineca and Peace River ..                                                       | 905                  | 2                      | 1                                            | 8                            | 10     | 18     |
| <b>No. 3 District.</b>                                                           |                      |                        |                                              |                              |        |        |
| Nicola and Vernon . . . . .                                                      | 291                  | 1                      | 1                                            | 4                            | 3      | 7      |
| Yale, Ashcroft, and Kamloops                                                     | 72                   | 2                      | ..                                           | 7                            | 11     | 18     |
| Lillooet and Clinton . . . . .                                                   | 1,588                | 1                      | 1                                            | 2                            | 3      | 5      |
| <b>No. 4 District.</b>                                                           |                      |                        |                                              |                              |        |        |
| Gand Forks, Greenwood, and Osoyoos . . . . .                                     | 46,274               | 13                     | 4                                            | 93                           | 160    | 253    |
| Similkameen . . . . .                                                            | ..                   | ..                     | ..                                           | ..                           | ..     | ..     |
| <b>No. 5 District.</b>                                                           |                      |                        |                                              |                              |        |        |
| Fort Steele . . . . .                                                            | 360,845              | 1                      | 1                                            | 211                          | 200    | 411    |
| Windermere and Golden . . . .                                                    | 862                  | 2                      | 2                                            | 15                           | 5      | 20     |
| Ainsworth . . . . .                                                              | 5,265                | 13                     | 4                                            | 49                           | 21     | 70     |
| Slocan and Slocan City . . . .                                                   | 46,454               | 36                     | 8                                            | 149                          | 116    | 265    |
| Nelson and Arrow Lake . . . .                                                    | 5,917                | 8                      | 2                                            | 54                           | 40     | 94     |
| Trail Creek . . . . .                                                            | 18,982               | 4                      | 3                                            | 58                           | 13     | 71     |
| Revelstoke, Trout Lake, and Lardeau . . . . .                                    | 73                   | 2                      | ..                                           | 8                            | 5      | 13     |
| <b>No. 6 District.</b>                                                           |                      |                        |                                              |                              |        |        |
| Vancouver Island (Nanaimo, Alberni, Clayoquot, Quatsino, and Victoria) . . . . . | 19,900               | 1                      | 1                                            | 33                           | 17     | 50     |
| Mainland (Vancouver and New Westminster) . . . . .                               | ..                   | ..                     | ..                                           | ..                           | ..     | ..     |
| <b>Totals</b> . . . . .                                                          | 1,573,186            | 98                     | 33                                           | 1,146                        | 964    | 2,110  |

### The Colliery Districts

Coal production, the bulk of which was the product of Vancouver Island mines, leads all inerals in point of value. The gross output in 1922 was 2,580,915 long tons, of which 69,072 tons were made into coke. These figures show an increase over 1921 of 11,276 tons gross and of 27,848 tons net. Coke totalled 45,835 tons, a decrease of 13,599 tons from 1921.

A summary of the coal output gives the following figures:—

|                                 | 1921      | 1922      |
|---------------------------------|-----------|-----------|
| Vancouver Island . . . . .      | 1,625,931 | 1,754,656 |
| Nicola District . . . . .       | 183,153   | 270,890   |
| Crow's Nest . . . . .           | 759,755   | 554,361   |
| Omineca . . . . .               | 800       | 1,008     |
| <b>Total mined</b> . . . . .    | 2,569,639 | 2,580,915 |
| Made into coke . . . . .        | 85,644    | 69,072    |
| <b>Net production</b> . . . . . | 2,483,995 | 2,511,843 |

The net coal production for 1922 was 27,848 tons more than in 1921 and greater than in any year since 1912 with the exception of 1920.

The report states:

"The greater part of the gross Provincial production is still being mined by three companies—the Crow's Nest Pass Coal Company of East Kootenay; the Canadian Collieries (Dunsmuir), and the Western Fuel Corporation of Vancouver Island, which mined, collectively, 72 per cent of the gross output.

"Of the other collieries; in the Coast District, on Vancouver Island, the Pacific Coast Mines, Limited, now in liquidation, mined no coal, but recovered 4,752 tons of slack from one of the old dumps at the Morden mines; the Nanoose Collieries, Limited 99,049 tons; the Granby Company, from their colliery near Cassidy, produced 276,919 tons; and King and Foster conducting operations at the Old Wellington, made a production of 9,148 tons. In the Nicola Valley section of the district the Middlesboro Colliery Company mined 69,330 tons; the Fleming Coal Company, 38,485 tons; the Princeton Coal & Land Company, 19,418 tons; the Coal-mont Colliery, 142,806 tons; the Chu Chua Colliery, 618 tons; and the Community Coal & Coke Company Limited, 233 tons of coal.

A new coal field has been opened up in the Omineca District, where two small collieries are being developed on the Telkwa River. The Aveling coal mine shipped in 1922, 669 tons of coal and the Telkwa Collieries 339 tons, making a total for that section of 1,008 tons of coal. For convenience this has been included in the Coast District figures.

"In the East Kootenay District, in addition to the Crow's Nest Pass Coal Company, which produced 508,339 tons, the Corbin Coal & Coke Company produced 46,022 tons.

"The collieries of the Coast District, including the Nicola-Princeton and Telkwa fields, are to be credited this year with about 78 per cent of the total coal output. Of this gross amount there was sold for consumption in Canada 1,397,918 tons; sold for consumption in the United States 762,118 tons; sold in other countries, nil; making the total coal sales for the year 2,160,036 tons of 2,240 lbs.

"In addition to the coal sold, there was used in the manufacture of coke 69,072 tons, and used under companies boilers etc., 205,529 tons; while 175,719 tons was lost in washing and screening."

The reports by district engineers give interesting details of production of existing mines and the developing of properties to the stage of production. The famous Portland Canal section is especially reported upon, and the enormous development there, especially on such properties as the Premier Mine, is outlined.

The total value of the mineral production for all years up to and including 1922 is put at \$769,418,462, of which placer gold aggregated \$76,542,203; lode gold, \$416,621,913; coal, \$213,768,000; coke, \$24,520,567.—R. D.

"Stainless silver" is reported as the latest addition of Sheffield cutlers to their long list of inventions. If, as reported, the new alloy fulfils the "sterling" qualification of 92½ percent silver content, and yet remains bright for two years without polishing, it will rival stainless steel in its application to domestic economy.



# THE MINING DISTRICTS

BY THE JOURNAL'S CORRESPONDENTS.

## ONTARIO

**Power** — The Northern Canada Power Company, which has acquired the Quinze power in Quebec, has lost no time in making preparations to deliver power to Porcupine at the earliest possible moment. Immediately the lease was signed, contracts were let for the building of a one hundred and twenty mile transmission line, with steel towers, and some contracts have also been let for construction work at the power site. The undertaking is completely financed and officials of the company state that they will be delivering power to Porcupine not later than the fall of 1924. The power officials are also of the opinion that, given the ordinary amount of rain during the coming summer and fall, the present plants on the Metagami River will be able to carry the camp through the winter. The Sturgeon Falls plant, however, is not yet in commission and is not expected to be until after the flood water is over, so that it is altogether likely that another shortage will occur next winter. With the assurance of plenty of power in the immediate future, however, this will not be as serious as similar shortages have been in the past.

**Porcupine** — The talked-of strike in Porcupine did not materialize and mines are working on a normal basis. The parade on Mayday was very poorly attended, only about four hundred mine workers being present out of approximately three thousand in the camp, and most of these were back at work the next day. The mines are rapidly getting back to normal conditions and McIntyre is treating approximately 1000 tons a day for the first time in its history, which will aid materially to the output of the camp. Several hundred more miners are needed, but men are rapidly drifting back and it is possible that no great difficulty will be experienced for some little time, especially as additional miners can, no doubt, be secured from England. A recent report of the Ontario Mining Association, covering the nationalities of the men in all the principal mines of the Province, disposes of the claims of labor leaders that a very large percentage of the workers are of foreign extraction, and will, no doubt, be of great assistance to the companies in their efforts to bring in men. The report shows that Canadians and British workers constitute 61% of the total number employed, while 37% is drawn from eight different countries. Of these, Italians constitute 9.2% of the total, Finns 7.8 per cent, Poles 7.6 per cent, Slavonians 4.2 per cent, Austrians 4.1 per cent, Americans 1.4 per cent, Russians 1.3 per cent, Rumanians 1.2 per cent, while all other countries contribute 2.3 per cent.

Recent developments at the Vipond property in Porcupine have been very encouraging and the directors are considering the re-opening of the mill. During April a new vein was encountered on the 400-foot level which has been drifted on for a length of 180 feet, and

shows an average value between \$16.00 and \$20.00 across widths from 5 to 12 feet. Cross-cuts are now being driven on the 300 and 500-foot levels to intercept the same ore-body, and if the vein is found to maintain its widths and values, the mill will be started. The company has developed a considerable tonnage of comparatively low-grade ore, but with the new ore-body to raise the general average, it is believed that a grade can be obtained that will justify the mill being opened.

The Schumacher is making another distribution of assets, amounting to 17 cents a share. The money is derived from the payments received from the Hollinger on account of the purchase price of the property.

The Hollinger has declared the regular dividend of 1 per cent. payable May 21st to shareholders of record May 3rd.

Diamond drilling has been started on the Keora property and this will be followed by a campaign of underground exploration. Engineers are now on the ground making ready for this. Arrangements have also been made to start work on the Ankerite. The property has been closed down for several years, since the option on it was dropped by the Coniagas.

On the 1875-foot level of the No.9 vein of the McIntyre, some of the most spectacular ore ever discovered in Porcupine has recently been found. The high-grade is confined to a narrow quartz section about six inches in width, which runs several thousands to the ton.

**Kirkland** — A special meeting of the shareholders of the Teck-Hughes was held a few days ago to pass by-laws permitting the directors to acquire shares, bonds and debentures in any other corporation having objects similar to those of Teck-Hughes, or to carry on any business capable of being conducted so as directly or indirectly to benefit the company, and granting them use of the funds for that purpose. This particular by-law will permit the directors to conclude the negotiations for properties similar to that of the Orr Gold Mines without the legal difficulties that arose in that case. Further by-laws permit the directors to fix their remuneration and all salaries without any further specific assent of the shareholders; authorize the directors to borrow money on the credit of the company; permit the directors to pay dividends out of the funds of the company, notwithstanding that the net assets of the company may be thereby reduced to less than the par value of its issued capital stock.

**Cobalt** — It is learned that silver has been encountered in the Colonial shaft at a depth of 930 feet. A vein was encountered in cutting the station, and in the first round of the drift leaf silver was found. Sufficient work has not been done yet to determine the



value of this discovery, but it is particularly important as it opens up a possible new section.

**Larder** — At the Crown Reserve property in Larder Lake, the No 2 vein has been encountered in the cross-cut from the 550 foot level and shows a width of 14 feet, which runs from \$7.00 to \$14.00 a ton. This is not the main vein of the property, and the latter will be out very shortly. The development of this property has been very encouraging and it gives every assurance of being a profitable producer. The company has not yet taken any action regarding a milling plant, but if the developments on the 550-foot level bear out the results on the upper levels, this matter will, no doubt, receive consideration in the near future.

## QUEBEC

**Travel Routes to the Rouyn-Dubuisson Gold Belt.** — There is considerable discussion as to the best routes to follow to reach the Dasserat-Rouyn-Dubuisson gold belt, which has come to such prominence since the discovery of gold in Rouyn township last fall. In view of the importance of the development, especially in Rouyn, and, judging from the heavy demand for prospecting licenses, in view of the impending rush to numerous points along the belt, a few words on each of the principal routes to follow may be of interest.

**Extent of the Belt.** — In his report on the geology of "Temiskaming County, Quebec", (G.S.C. Memoir 86, '918), Dr. M. E. Wilson states that the belt of rocks of the Pontiac series, the equivalent of the Temiskaming series of Ontario, is 110 miles long and extends from the Ontario-Quebec boundary east to lakes Christopherson and Matchimaniou, the headwaters of the Bell river. The zone most favourable to prospecting, comprising this belt of sedimentaries and the Keewatin volcanics to the north of it, is believed to have an average width of 10 miles.

The mineralized area can be approached on three sides from railways. To the north, following a nearly parallel course at distances varying from 20 to 40 miles, runs the northernmost transcontinental line of the Canadian National Railway; twenty-five miles west of the western extremity of the belt is Dane station on the Temiskaming and Northern Ontario Railway; while to the south, navigation on Lake Temiscamingue joins the Kepawa branch of the Canadian Pacific Railway and the head of the lake, which is only 60 miles from the belt. The C. P. R., it is said, will have completed by next September its Mattawades Quinze branch, bringing its terminus to within fifty miles of the mineralized region.

For the present, prospecting activities are centered in Rouyn. This township is 35 miles south of Macamic on the C. N. R., 45 miles east of Dane, on the T. & N. O. Ry., and 60 miles north from Lake Temiscamingue.

**The Route From Ville-Marie.** — The choice of a travel route to the mineralized area depends altogether upon which section of the 110-mile stretch one wishes to examine.

During the past winter prospectors that came into Northwestern Quebec were men from Ontario; they came by the way of Dane to Larder Lake, thence with dog teams over the winter road used by lumber crews.

While this was a good winter route, the road is much less suitable for summer travel.

During the coming season the quickest way to get to Rouyn will be by motor boat via Lake des Quinze. As soon as river conditions permit, a dependable transportation service will make regular trips from Ville-Marie to Rouyn. A company has been formed to cater to the traffic. Transportation will be by automobile from Ville-Marie to Gillies Bay, a distance of 24 miles, thence by motor boat by Lake des Quinze and Kinojevis river to Pelletier landing in Rouyn township, a stretch of 80 miles. From Ville-Marie to Rouyn the trip will be made in twelve hours.

The prospectors wishing to explore the central portion of the belt will be landed by motor boat at the portage to lake Vaudray, or on lake Kinojevis if they care to canoe up the river to Clericy township or beyond.

Ville-Marie, the county town for Temiscamingue county, has a population of 840. It is the most important center on the Quebec side of Lake Temiscamingue. A mining claim recording office has now been opened there.

**The Opasatica Route** — When navigation closes next fall it is expected that the North Temiscamingue-Lake Opasatica route to Rouyn will be completed. This route, with a length of 57 miles, will thenceforth be used in summer as well as in winter.

**Routes from Ontario** — If one does not care for the comfort and rapidity of motor boat navigation as offered by the Ville-Marie route, one can reach the promising belt of the Temiskaming sediments by various canoe routes. The western end of the area, Dufay, Dasserat and Boischatel townships, is accessible from North Temiscamingue by way of the Blanche river; from Larder Lake, by Raven lake; and from La Sarre by lake Duparquet. Dufresnoy and Rouyn townships may also be reached by canoe from La Sarre.

**Proposed Road from Macamic** — Much has been written lately in newspapers about a projected road from the C. N. R. station Macamic to Rouyn township. Macamic, the nearest railroad station to the camp, is 35 miles distant directly to the north. The intervening country has been scouted and it is reported that the ground is favourable for the building of a good road all on solid bottom and without heavy grades. As the construction of such a stretch of road through virgin forest is expensive it should not be expected that it will be constructed before more is known of the probable importance of the Rouyn camp.

**From Villemontel and Amos** — To reach the headwaters of the Kinojevis river one could make use of the advantages of motor boat transportation as far as the portage to lake Kewagama by leaving the train at Amos, in preference to portaging to the Kinojevis river over the Villemontel road which is only partly completed. The Villemontel route is a good colonization road over the greatest part of its length, but the lower part is only used as a winter road. Most probably it will be completed during the coming season.

**The Harricana Route** — South of Amos the Harricana river offers a long stretch of still water navigable



by boat. Gasoline launches can be hired to travel to lake La Motte or to lake de Montigny in Dubuison township, where development work has been performed on some interesting prospects. At Amos there is a government office where prospector's certificates may be obtained.

The little town of Nottaway should be made the starting point of parties desirous of examining the unprospected eastern end of the sedimentary belt, especially Louvicourt and Marrias townships. From the headwaters of the Bell river, going by the way of Victoria Dept, 40 miles up-stream, parties could readily reach Sabourin and Bourlamaque townships, the headwaters of the Harricana river, and proceed westward without difficulty.

### NORTHERN MANITOBA

The Bingo Mine at Herb Lake in Northern Manitoba is now equipped with a complete plant for mining operations, which has been furnished and installed by Engineering Equipment Company, Montreal. Mr. Joseph Meyers, managing director of the company, has stated that no mill for treating the gold ore will be installed until sufficient ore has been blocked out to ensure a steady supply, and until thorough tests have been made to show exactly the milling equipment required. The shaft, which is now 200 feet deep, will be sunk to 400 or 500 feet, and drifting will be commenced immediately to explore the vein system on the 200-foot level.

The Luleo property at Rice Lake, now controlled by the Selkirk Gold Mines Co. with headquarters at New York, is already equipped with a stamp battery, and it is proposed to operate this during the coming summer as well as to explore further the veins disclosed on the claims.

### NOVA SCOTIA

**Mabou Mine to be Operated.**—It is stated on good authority that the Mabou coal mine in Inverness County on the west coast of Cape Breton has been sold to a company that intends to open it up and tunnel through to other underlying seams. It has been known for some time that A. J. Tonge, formerly of the Dominion Coal Company, was trying to interests English capital in the property and it now looks as if he had succeeded. The public press has stated that "the taking over of the property is conditional on the Government building a short railway." There can be little truth in this statement, for no one believes that the Government intends to build a railway for any coal company. A short spur of railway may be built to one of the near-by harbours. Mabou mine, however, is only a short distance from the Inverness Railway. Besides this it has a short line of its own running to tide-water, where coal can be shipped all summer in small schooners. But if the mine is to be a large producer, a more practical and permanent means of transportation will have to be found.

Heretofore lack of capital has handicapped the development of this valuable property. The company that opened it up was financially weak. It is understood that the company now about to take it over is capitalized at two million dollars.

The mine is under water and has been so for a number of years, but it can easily be pumped dry as the

workings are not extensive and do not hold as much water as some of the large lodgements at the pumping stations of the Dominion collieries. The inflow of water at no time was great and if pumping facilities at the beginning when water first began to flow in had been adequate, the mine could easily have been kept clear of water.

There is much difference of opinion as to the source of mine water in this field. Some hold that the sea finds its way in, while others are of an opposite opinion. It is now generally believed that the "plaster" formation in which these seams lie has, at some time in the past, been dotted with small pits which became partly filled with water and debris, the water thus finding its way into the mine.

There are several seams in this field. The coal is of splendid quality, one seam being almost a semi-anthracite. Even at the outcrop it is close in texture, hard, and lustrous. Two of the seams lie sufficiently close together to be worked in the same slope or shaft. This could be done by tunnelling through, as the distance is comparatively short. The outcrop shows a very heavy pitch, but it has been found that the seam flattens quickly underground.

Not far from Mabou lies the St. Rose coal seams, which are also said to be of excellent quality. Here again the difficulty to be overcome is one of transportation, which is not insurmountable and not even a serious problem to a company with sufficient capital. Should the Mabou mines be developed there is very little doubt that within a short time the St. Rose areas would be connected, and Inverness County would greatly increase its coal output.

**The May Day Demonstration.**—Following the prompt action of the Nova Scotia Government, which by sending a number of special constables to Sydney previous to April 1st., forestalled the steel strike being fomented by the Red element of Sydney, the Immigration Department stopped Alex. Howatt, Kansas agitator, from entering Canada. He was on the programme to deliver the May Day oration at the demonstration held in Glace Bay. Resolutions threatening strike and sabotage at the collieries if Howatt was not allowed to enter Canada, were passed, but the Department was obdurate and Howatt was held. The Reds had their day, however, and marched through Glace Bay under the red flag with its blazoned motto, "Long live Communism." In all about fifteen hundred steel workers and miners were in the march. Many were foreigners from Russia and Southern Europe, and were headed by a handful of hair-brained Scots and Canadians.

**Steel Mills Continue to Run.**—The steel workers of Sydney intended to make a show of strength and to shut down the steel plant. They did not succeed, however, as only two of the departments were forced to close for the day and labour had on May Day a very rude awakening as to its fancied strength. When they reached Glace Bay another shock awaited them when they found that while the most of the mines had remained idle, the workmen preferred to be onlookers and did not join the march. Indeed, some of them openly showed their resentment of the "song of the red flag." There is little doubt that a reaction has set in among the miners of Cape Breton, and that the May Day demonstration has been most damaging to the cause of the "Workers' Party of Canada," whose whole aim is to propagate the doctrine of the destruction of life



and property, and the overthrow of the constituted government of the country.

**Law and Order Upheld at Springhill.**—In the meantime, International Officer Van Bitner of Indianapolis visited the town of Springhill and addressed large meetings there. He stated that the United Mine Workers were a law-abiding organization and were strongly opposed to the liberation of labour by force, and that the men who originated and backed up the "Red" idea were "plum crazy". Mr. Bitner stated that his visit to Springhill had no connection whatever with the disturbed state of District 26 but that this matter would be dealt with as soon as President Lewis returned from Europe. The miners of Cumberland County have now cast off all allegiance to District 26, and have notified the International Secretary of their action. Pietou County will soon take the same action. It is not improbable that some strong union officer may in the near future be sent to take over the business of the district, to run it while it is being reorganized and saved from the "Red" element.

**Union Leaders Making Trouble.**—The District Executive are not idle in the face of what is taking place at International Headquarters. They have been making ready and are stirring up the Cape Breton Locals in readiness for a strike or any other action that will suit the occasion. While doing this, they openly state through the public press that the Dominion Coal Company has violated the agreement made last August. In order to set this report at rest, the Dominion Coal Company has requested the miners' executive to point out any violation of the agreement. This should have been done previous to any statement to the press, but this is not the style of business that suits the present union officers of this District. Some grievances of a local nature were brought up, but they did not affect the agreement.

**Restriction of Output.**—A matter that affects the public is a resolution passed by one of the locals restricting the day's work to be done by a certain type of coal mining machine. Under ordinary conditions, when the market warrants it, workmen are justified in asking for an increase in wages or for a shorter working day, but to limit the day's output is another matter. It affects every coal consumer in Canada if the miners take upon themselves to say just what amount of coal should be sent out of the mines under certain conditions. This tends to produce an artificial scarcity and this feature, as the experience of the winter just passed has shown, sends prices soaring. There is no need to dwell on this; it is all too vivid in our minds.

**The Wage Question.**—While all this trouble is being stirred up between the companies and the labor organizations and between the District and the International headquarters, an immediate danger threatens the coal industry. There is now an agitation for a return to the 1921 rates of pay, the war peak wages. No other company in Canada gave such large increases during the war, and it is unfair to ask a continuation of these. Indeed it is not possible that the collieries of Nova Scotia can pay war wages and continue to operate. It would mean the closing down of nearly every colliery in the Province. If the International Executive are under any illusion as to the ability of our collieries to pay these rates, they should be advised at once of the true conditions, and be invited to investigate them on the spot. The coal companies on

their part should be willing to give every opportunity for a full and free inquiry, and disinterested officials of the United Mine Workers need not be feared. Men who are familiar with conditions of coal mining in the United States, will be quick to see the disadvantages of Nova Scotia mining and no doubt just as quick to admit them. But "while the cauldron boils" the battle should be fought and decided on the issue of fair competition, for if nature has handicapped our coal fields by unfavourable conditions, reason should come to the rescue and state just how far we are able to follow certain prescribed union regulations and still live. It should not be forgotten in summing up the situation that the coal miners of Nova Scotia are not under the disability of so much broken time, due to over development, as their American neighbors. The yearly average earnings should be taken into account, as well as the daily. If this is not done, and if wages are forced above their normal level, it will react on the average yearly income and will greatly lower it. The loss to miners will be large, but to the country it will be disastrous.

## REPORTS ON EXPLOSIVES

The United States Department of the Interior has just published, through the Bureau of Mines, Bulletin 219, "Explosives, their materials, constitution, and analysis," by C. A. Taylor and W. H. Rinkenbach, assistant explosives chemists.

No complete work on explosives, their constitution and analysis, has hitherto been published, state the authors of the bulletin. Several books that contain chapters on analysis do not cover the matter thoroughly. Methods that manufacturers, testing stations, and other agencies have developed to meet their own requirements have not been made public. The Bureau of Mines has previously issued four publications covering special phases of the subject. This bulletin is not intended to replace these reports, but rather to cover present methods employed in the industry and to include all classes of explosives and the material used in their manufacture. No sharp distinctions can be drawn between classes of explosives. Surplus military explosives, for example, may be used for blasting, just as blasting explosives, under some conditions, may be employed for military purposes. Moreover, one class gradually merges into another because of similarity in composition.

Explosives are grouped in the bulletin as dynamites, black powders, propellants, detonators, and primers. Some materials are used in practically all these groups; others in only one. To discuss all the materials that have been or that may be used and the methods for their identification and qualitative determination is not feasible, but the methods described will probably suggest ways of examining new mixtures.

The bulletin contains information regarding the handling of explosive materials; the properties and analysis of materials used in explosives; products of explosion; the thermochemistry of explosion; liquid oxygen explosives, etc.

Bulletin 219 may be obtained from the Superintendent of Documents, Government Printing Office, Washington, D. C., at a price of 20 cents.

It is reported from Johannesburg that a number of mines on the Rand are to discard amalgamation in favour of corduroy blanketing.



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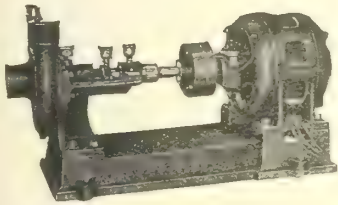
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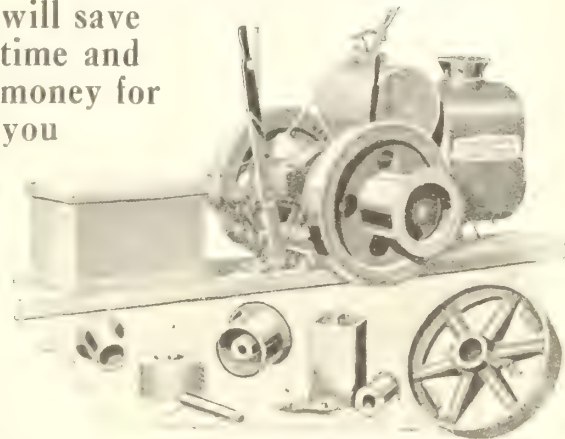
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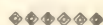
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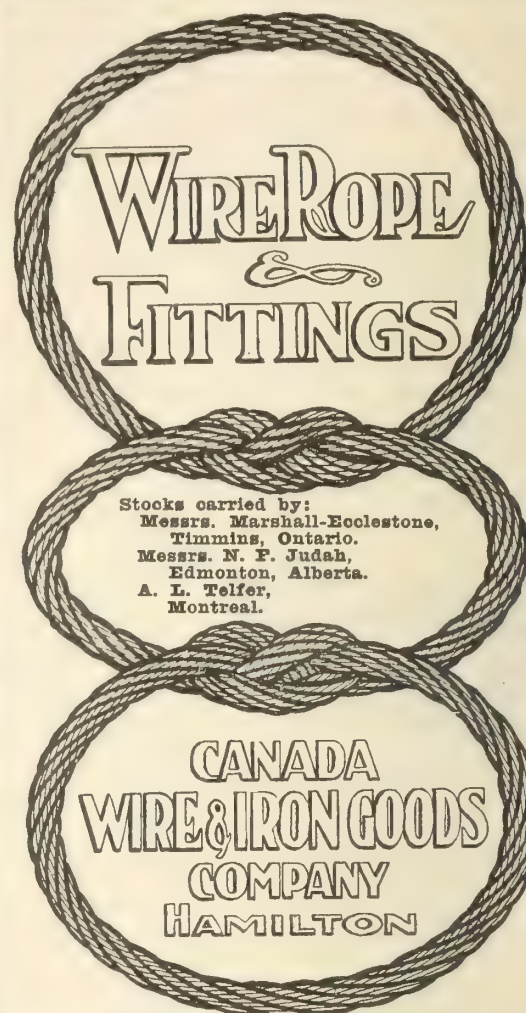
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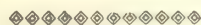


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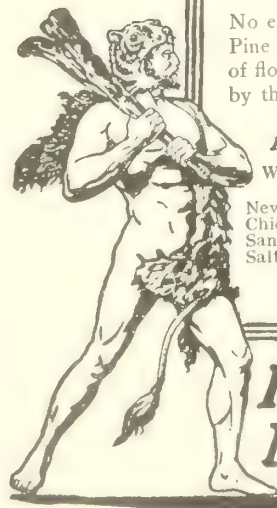
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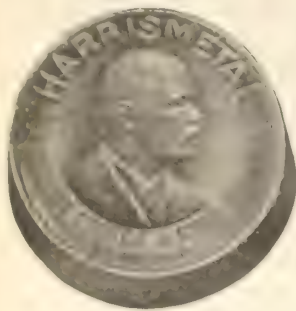
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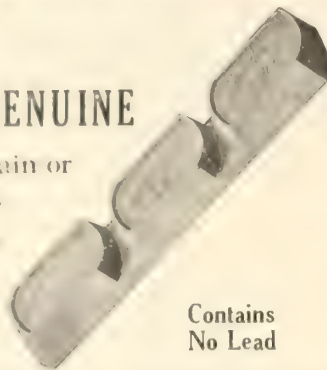
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Canadian Mead-Morrison Co.  
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Holman Bros., Ltd.  
Sullivan Machinery Co.
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Jones & Glassco (Regd.)
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Denver Rock Drill Mfg. Co., Ltd.  
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Hendrick Mfg. Co.  
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Sullivan Machinery Co.
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Hull Iron & Steel Foundries  
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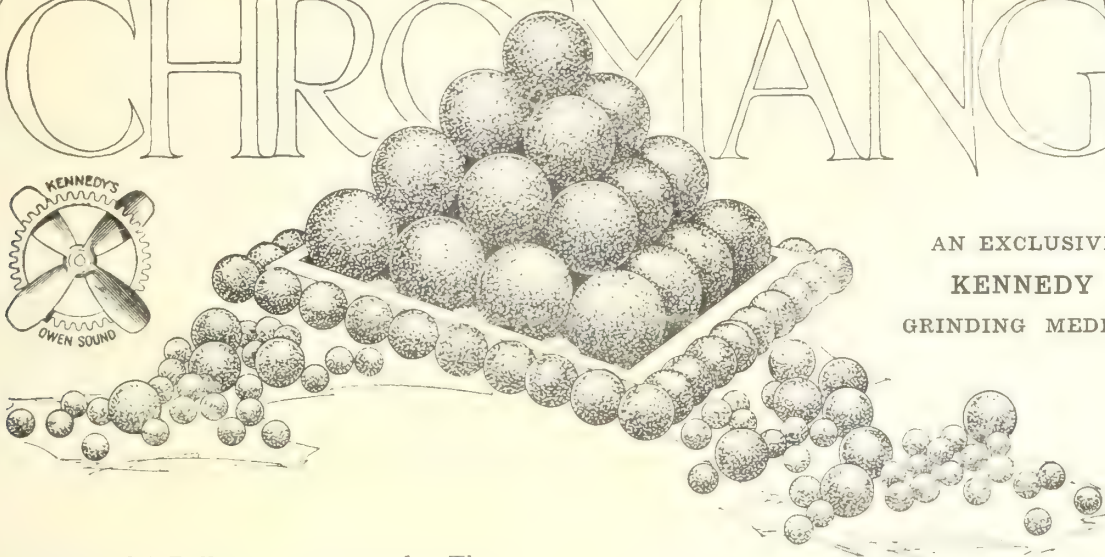
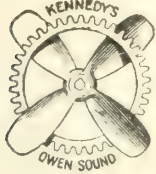
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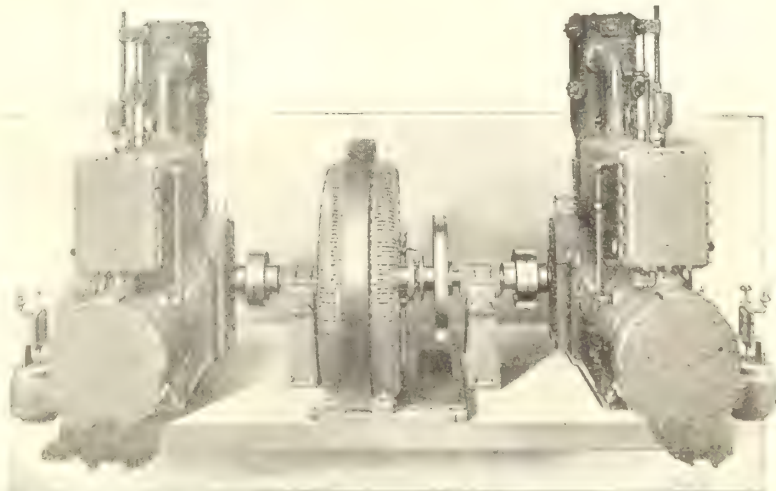
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Department of Colonization, Mines and Fisheries

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MINISTER OF COLONIZATION, MINES AND FISHERIES, QUEBEC

**MINER'S CERTIFICATES.** First of all, obtain a miner's certificate, from the Department in Quebec or from the nearest agent. The price of this certificate is \$10 and is valid until the first of January following. This certificate gives the right to prospect on public lands and on private lands, on which the mineral rights belong to the Crown.

The holder of the certificate may stake mining claims to the extent of 200 acres.

**WORKING CONDITIONS.** During the first six months following the staking of the claim, work on it must be performed to the extent of at least twenty-five days of eight hours.

**SIX MONTHS AFTER STAKING.** At the expiration of six months from the date of the staking, the prospector, to retain his rights, must take out a mining license.

**MINING LICENSE.** The mining license may cover 40 to 200 acres in unsurveyed territory. The price of this license is Fifty Cents an acre per year, and a fee of \$10.00 on issue. It is valid for one year and is renewable on the same terms, on producing an affidavit that during the year work has been performed to the extent of at least twenty-five days' labour on each forty acres.

**MINING CONCESSION.** Notwithstanding the above, a mining concession may be acquired at any time at the rate of \$5 an acre for SUPERIOR METALS, and \$3 an acre for INFERIOR MINERALS.

The attention of prospectors is especially called to the territory in the North-Western part of the Province of Quebec north of the height of land, where important mineralized belts are known to exist.

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### Aggregate Value of \$734,259,619

The substantial progress of the Mining Industry of this Province is strikingly exhibited in the following figures, which show the value of production for successive five-year periods: For all years to 1895, inclusive \$94,547,241; for five years, 1896-1900, \$57,605,967; for five years, 1901-1905, \$96,709,068; for five years, 1906-1910, \$125,534,474; for five years, 1911-1915, \$142,072,603; for 5 years 1915-1920 \$189,922,725; 1921, \$28,066,641; for the year 1922, \$35,158,843.

### Production During last ten years, \$339,280,940

Lode-mining has only been in progress for about twenty-five years, and not 20 per cent. of the Province has been even prospected; 300,000 square miles of unexplored mineral bearing land are open for prospecting.

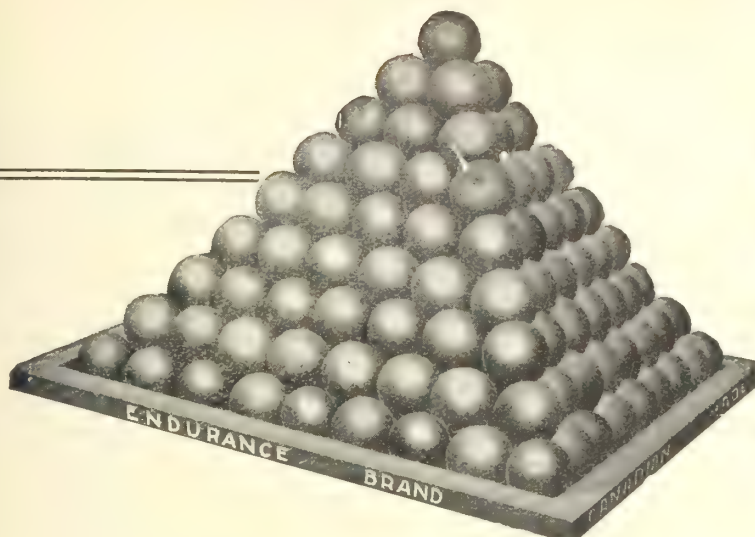
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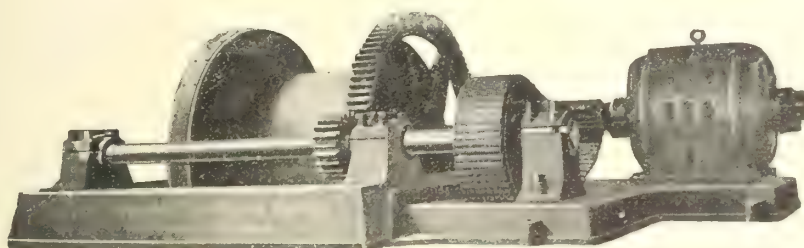
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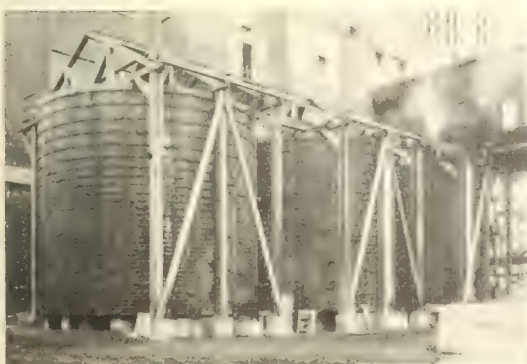
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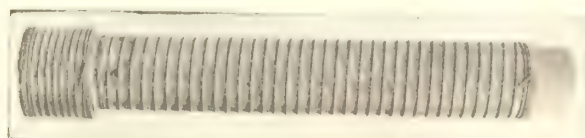
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# Ontario's



PROVINCE OF ONTARIO

# Minerals

DEPARTMENT OF MINES

HON H. MILLS, Minister of Mines

## Mineral Areas.

Ontario, with its 40,262 square miles, contains many millions of acres in which the geological formations are favorable for the occurrence of minerals, 70 per cent of the area being underlain by rocks of pre-Cambrian age. The phenomenally rich silver mines of Cobalt occur in these rocks; so also do the far-famed nickel-copper deposits of Sudbury, the gold of Porcupine and Kirkland Lake, and the iron ore of Magpie and Moose Mountain mines.

## Economic Minerals.

In addition to the above, practically all economic minerals (coal and tin excepted) are found in Ontario:—actinolite, apatite, arsenic, asbestos, cobalt, corundum, feldspar, fluor-spar, graphite, gypsum, iron pyrites, lead, mica, molybdenite, natural gas, palladium, petroleum, platinum, quartz, salt, talc and zinc. This Province has the largest deposits on the continent of talc, feldspar, mica and graphite.

Building materials, such as ornamental marble, limestone, sandstone, granite, trap, sand and gravel, lime, portland cement, brick and tile, meet every demand.

## Mineral Production.

Preliminary returns show the output of the mines and metallurgical works of the Province for the year 1921 to be worth \$48,128,387, of which the metallic production was \$27,504,202.

The following figures show the rapid growth of Ontario's mineral industry by five-year periods since 1891:

| Year.          | Value.      | Year.          | Value.       |
|----------------|-------------|----------------|--------------|
| 1891 . . . . . | \$4,705,672 | 1906 . . . . . | \$22,388,383 |
| 1896 . . . . . | 5,235,003   | 1911 . . . . . | 41,976,797   |
| 1901 . . . . . | 11,831,086  | 1916 . . . . . | 65,303,822   |

## Dividends.

Dividends and bonuses paid to the end of 1921 amounted to \$23,140,734 for gold mining companies, and \$84,388,185 for silver mining companies or a total of \$107,528,919.

## Mining Regulations.

A miner's license costs \$5.00 per annum, and entitles the holder to stake out in any or every mining division three claims of 40 acres each. After performing 200 days' assessment work on a claim, patent may be obtained from the Crown on payment of \$2.50 or \$3.00 per acre, depending on location in unsurveyed or surveyed territory.

## Assay Office.

The Provincial Assay Office at No. 5 Queen's Park, Toronto, is maintained by the Department of Mines for the free identification of minerals, free assays under the provisions of the Mining Act of Ontario, and also for general assay work as per the Schedule of Charges which may be obtained on application.

## Temiskaming Testing Laboratories

The Department maintains, at Cobalt, an ore sampling and testing laboratory which is now prepared to receive parcels of gold ore from 100 pounds upward, and after sampling and assaying the same to pay to the shipper the value thereof, less treatment charges. The purpose is to afford a market for ores extracted by prospectors and others in developing their mining claims, enabling them to obtain funds which they can use for further work and to report on the most satisfactory method of treatment. Fuller information may be obtained on application to the Manager, Temiskaming Testing Laboratories, Cobalt, Ontario.

## Publications.

For list of publications, illustrated reports, geological maps and mining laws, apply to

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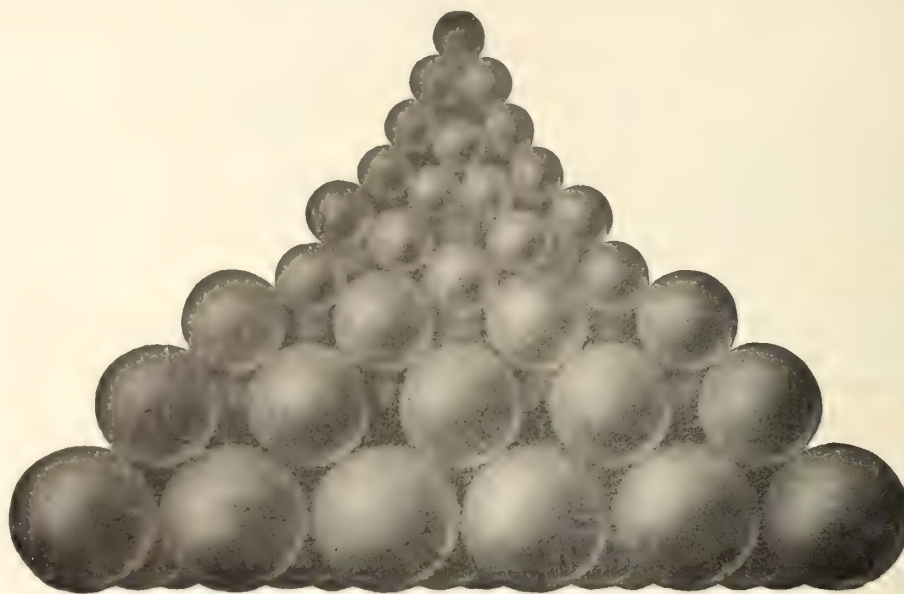
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*Devoted to the Science and Practice of Mining, Metallurgy and the  
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to their progress in Canada*

VOL. XLIV

Gardenvale, Que., May 18th, 1923

No. 20

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W. M. Goodwin, Editor,

Gardenvale, Que.

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# Serving Canada's Mining Industry

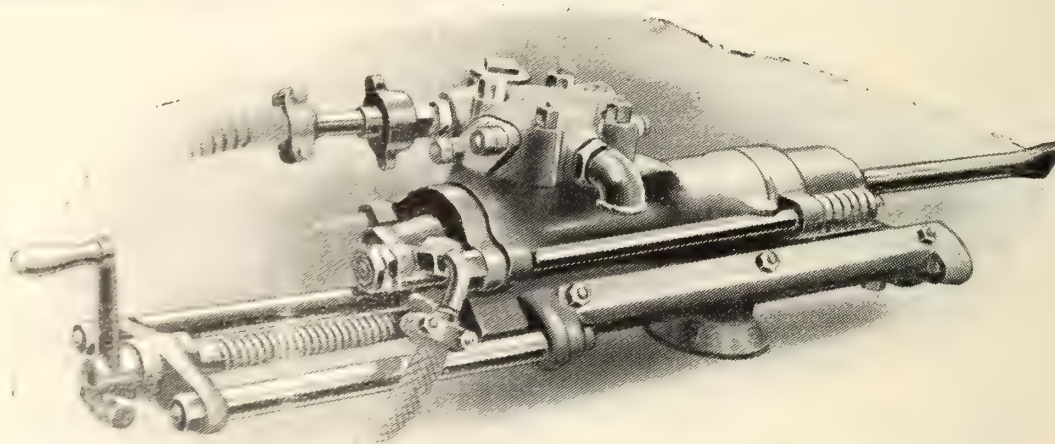


It is many years since The Imperial Bank of Canada, recognizing the importance of the Canadian mining industry and realizing the need of banking facilities for those engaged in its development, first opened a branch in Northern Ontario.

Since then the Imperial Bank's service has gradually extended until the mining interests in the rich area between North Bay and Hearst are now linked up by a complete chain of 12 branches.

This Bank's service to the mining industry is not confined to Northern Ontario alone. In all the mining areas throughout Canada the "Imperial" is rendering a valuable and complete financial service.

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## :-: EDITORIAL :-:

### THE BUDGET AND THE MINER

The annual budget presented by Mr. Fielding last week contained few items that affect directly our mineral industry, and these items are, we judge, very satisfactory. The duty of six-tenths of a cent per gallon on fuel oil is designed to protect the coal operators of Vancouver Island against the competition of oil from California and Peru. As the supply of cheap fuel from these sources may last only a few years, and as the closing of collieries on Vancouver Island might cause irreparable damage, it is probably true national economy thus to aid the coal operator at the expense of the consumer of fuel.

The outstanding item in Mr. Fielding's announcement, so far as the mineral industry is concerned, is the bounty of  $1\frac{1}{2}$  cents a pound on copper bars and rods. This is to be reduced annually and expires in 1928; but by that time the manufacturer of rods in Canada from Canadian copper should be firmly established. There are at present two copper rod mills in this country, one at the Consolidated Mining and Smelting Co.'s plant at Trail, British Columbia, and the other at the Brockville, Ontario, plant of the Eugene F. Phillips Electrical Works, Limited.

The Trail mill has never been operated, due to the late slump in copper prices as well as to the mischance that prevented a supply of copper concentrate from Copper Mountain reaching the smelter at Trail. Now, however, the Copper Mountain plant is being rapidly rehabilitated by Granby Consolidated, and will be supplying copper ore to the Trail smelter within a couple of months. The Rossland mines are also ready to ship ore to the concentrator at Trail as soon as it is released for use by the completion of the new mill at Kimberley. Thus within, say, two months we should see the rod mill at Trail at work on copper made from the ore of Copper Mountain, augmented later by ore from Rossland.

The Eugene F. Phillips rod mill in Brockville will use copper from Trail as soon as it is available and thus will earn the bounty. Meantime there is no impediment to the importation of copper for this purpose, as this is provided for by the 99 per cent drawback clause announced last week.

The budget is, in general, a colourless affair. It provides no means whereby the annual deficit can be met. Canada is still living beyond her income, and our government, this year as last, has failed to make

any serious attempt to make ends meet. Nor is there any indication that it will make such an attempt. In fiscal matters there is no hint of leadership from our political leaders. They are evidently content to travel serenely along the road that leads to bankruptcy.

This is a serious problem. We have the example of Great Britain, whose burden per capita is so tremendous compared with ours, to show what sound public financial methods, boldly conceived and courageously executed, can do towards the paying of national debts. Our taxes are among the lightest in the world. Our annual deficit in the national balance-sheet is trivial compared with the sum of our personal resources or the volume of our trade and commerce. It is a foolish, spendthrift course to over-expend our income, even by fifty millions a year. Our public finances present an outstanding example of thriftlessness to a people in whom wasteful and senseless expenditure is a besetting sin.

If Canadians, both in private life and in public offices, need one lesson more than another, it is a lesson in thrift. The budget of last week demonstrates a policy (or lack of policy) that is both thriftless and shiftless. It is time something was done to cope with this menace to our national solvency.

### LABRADOR EXPEDITIONS

Events of the past few weeks, as well as other events that are pending, serve to indicate that at last the general public is beginning to be suspicious of the ridiculous campaign of stock-selling conducted during the winter in the name of Labrador. Meantime several hundred thousands of dollars have been collected from the public, and no doubt have been securely tucked away for future reference by the promoters.

As the "Canadian Mining Journal" pointed out on numerous occasions prior to this silly "boom", Labrador is one of the most readily accessible of the unexplored parts of the "pre-Cambrian shield." Little is known of its geology, but that little is not unfavourable to the occurrence of economic minerals; in fact, the geology in places is decidedly favourable to the occurrence of ore-deposits. There have been determined already in the casual surveys made on the coast some areas of rock apparently of Keewatin age. — the rocks most prolific of mineral deposits in other parts of the shield. There are also intrusions of basic rocks such as caused the silver of Cobalt to be gathered



into veins. There has been little geological mapping of the coast and none of the interior. As for prospecting, the casual observation of a few explorers and brief visits from two or three searchers for placer gold in restricted localities comprise it all.

For the prospector, Labrador is literally an unknown land. Many have observed the coast along the six hundred miles of its length; few have landed on it, and these only at chosen spots, far apart. What the land holds for the prospector when he conducts a genuine search, no man knows.

The prospects of finding placer gold in paying quantities are not good, since the ground has been subjected to the same glaciation that has swept away the placers that undoubtedly existed at one time in the gold-bearing areas of Ontario and Quebec. There may be found in Labrador a remnant of these pre-glacial placers, as has been the case elsewhere; but the chances are much against it. Or exploration in the interior may disclose an area, similar to that in the Yukon, that has escaped the glacial action, though as yet there is no evidence of this. However, the fact that unglaciated hill-tops have been observed on the northern part of the coast indicates that the ice sheet of glacial times at that point was comparatively thin, and hence could be diverted with comparative ease.

If all the money that has been collected from the public in the name of Labrador were spent in expeditions to explore Labrador, we should have a fund of information about that little-known coast before the next winter makes it inaccessible once more. Unfortunately this event is far from likely. However, the money subscribed to certain of the Labrador schemes is to be honestly expended on exploration. To the men engaged in this prospecting in Labrador, the "Journal" wishes good fortune and a safe return, and to those who have backed these explorers with their money, a profitable investment.

### THE IMPERIAL MINERAL RESOURCES BUREAU

The fourth annual report of the governors of the Imperial Mineral Resources Bureau, dealing with the Bureau's work during 1922, has recently been issued. As the services of this Bureau are of growing importance to the mineral industry of Canada, it will be well to make this report the occasion of a review of its organization, objects and methods.

Among the benefits arising from the world war, none is fraught with greater significance to Canada than the general determination throughout the Empire to foster and extend inter-imperial trade, and to make the Empire, so far as possible, a self-sustaining and self-sufficient unit. The Imperial Mineral Resources Bureau was organized with the specific object of stimulating the development, for the common ben-

efit, of the Empire's mineral resources. This laudable object, previously left at haphazard, is now being pursued by a capable and energetic staff in London, who have the advice and the active aid of scores of the best brains in Great Britain, the Dominions and the Crown Colonies.

The offices of the Bureau in London are now the chief centre in the Empire for the collection and dissemination of information regarding the discovery, development and use of its mineral resources. In addition, comprehensive data are now available there concerning the world's mineral resources, this being necessary in order to gauge properly the comparative value of the Empire's known resources, as well as to provide for the most economical supply of those minerals not found within the Empire.

The Bureau collects information from all quarters of the globe, sifts and arranges it, and sends it out again in a most useful form. Its printed volumes forming the "Mineral Conspectus of the British Empire and Foreign Countries" are now familiar, in their grey cover, in every part of the Empire. The first task has been to summarize the known information regarding each of the commercial minerals. This prodigious task has been almost completed. Thereafter the information will be kept up to date by the publication periodically of volumes containing more recent information, as well as by new editions of the complete work on each mineral as occasion warrants. In addition to this Mineral Conspectus there is a statistical series giving for each mineral during the years 1919-21 the production, imports, exports and prices. Some of this series have already been issued and the preparation of the remainder is in an advanced stage. A number of volumes in the series, "Mining Laws of the British Empire and of Foreign Countries," have been printed and others are in the press or in course of preparation.

In addition to printing these works, the Bureau is now in a position to supply authoritative and recent information about the field it covers. The object is to give advice to the commercial world, to collect information for industries requiring knowledge as the possible sources of particular minerals, and to put producers of minerals in touch with consumers. There has been a large number of such inquiries during the past year.

The activities of the Bureau are guided and regulated by a Board of Governors composed of fourteen eminent men connected with the mineral industry. Canada's representative on this Board is Dr. Willet G. Miller, who is the nominee of the Federal Government. In addition there are fifteen Technical Advisory Committees, each dealing with a separate department of the Bureau's work or with a metal or groups of metals. Dr. Miller is chairman of the Committee on Nickel and Cobalt.



In order to have available recent and reliable information about mineral resources throughout the world, the Bureau has established relations with selected correspondents in all quarters, and files the information so obtained in a Technical Index, which is systematically kept up to date. In Canada the correspondents are officials in the various departments of mines, in addition to a few university professors. Correspondents have been obtained similarly in foreign countries wherever possible.

Gradually the Imperial Mineral Resources Bureau is assuming the functions and the importance of an emporium for the mineral wealth of the Empire. It holds, potentially, a position of vast responsibility, and it has commenced to fulfil its function in a fitting way. Tangible evidences of its utility are becoming more numerous with each succeeding year. Canada is supporting worthily the building up of this new Imperial institution.

### A VETERAN ENGINEER PASSES

Robert Carr-Harris died recently at his home in Bathurst, New Brunswick. With him passes one more of the few remaining links with pioneer engineering in Canada. He was in his eightieth year, and had been engaged in engineering practice in Canada since his graduation as a youth from King's College, London. While most of his practice was in the building and maintenance of railways, he became intimately known to many members of our mining fraternity, as a teacher, first in the Royal Military College, Kingston, and then in the School of Mining, Queen's University.

Though he was a man of brilliant mental attainments, Professor Carr-Harris will be remembered chiefly on account of his outstanding moral character. This was impressed, unconsciously, upon all those with whom he came in contact. He was one of the comparatively few human beings with whom conviction is synonymous with action. While far from infallible in his judgment, he allowed nothing to stand in the way of what he considered truth and justice. This at times led to self-denial that his friends considered an injustice to himself.

Professor Carr-Harris had an unusual capacity for enduring friendship, and fortunate are those upon whom that friendship was bestowed. He was a true philanthropist, in the literal sense of the word. His students and his friends might smile at his idiosyncrasies, but they could not doubt his good faith or his friendly interest.

A never-failing fund of energy and of good spirits was one of Professor Carr-Harris' most obvious qualities, until the first years of the war, when his eldest son, a doctor in military service, was killed in Egypt. From this blow he never fully recovered. He had nine sons, most of them engineers, and three daughters, by

two marriages. To the widow and the children who survive him the "Canadian Mining Journal" offers its sincere sympathy.

### THE MABOU COAL BASIN

With the prospect of a much enlarged market for the coal of Nova Scotia, substantial interest has been aroused in some of the outlying coal-bearing areas. Heretofore the capacity for production in the Sydney coal field has been sufficient for any prospective market, and as it is highly developed and ideally situated for shipment and produces coal of very satisfactory quality, there has been little incentive for the exploration and development of fields less favourably placed.

One of the coal basins of Nova Scotia of which little is known is that at Mabou, between Port Hood and Inverness on the west coast of Cape Breton Island. It is almost entirely a submarine area, lying in a narrow synclinal basin of which only the apex is exposed on land. The coal of this west coast does not, in general, make good metallurgical coke and its content of sulphur and ash is somewhat in excess of that of the Sydney field.

The Mabou mine was flooded in 1909 and has not been operated since that time. Contemporary evidence indicates that the flooding was due to carelessness and that the mine could be re-opened with little difficulty.

As the Mabou coal basin is virtually unexplored except at and near its outcrop, the natural course of events in its future development will be to resume production on the small scale warranted by present knowledge and simultaneously to explore its further possibilities. The property has been on the market for many years, and we hope that the recent public reports of its acquisition by English investors presage a resumption of activities that will result in profitable operation.

There was an interesting little item in the news from Glace Bay, Nova Scotia, last week. Silby Barrett, formerly International Board Member of the U. M. W. A. for District 26, "cleaned up" the staff of the "Labour Herald", of Bolshevik fame, with the aid of his brother. The dispatch intimates that if the "Red" editor and his staff had only been more numerous, say to the extent of a dozen or two more, a serious resistance might have been established. Mr. Barrett has made himself a fine record during recent years as a safe and sane labour leader, and now that the tide of popular sympathy in the Nova Scotia colliery districts is turning strongly in favour of the "moderates" the personal retribution meted out to the "Labour Herald" staff on account of their scurrilous personal remarks about Mr. Barrett has met with popular approval.



# THE MINE HOIST

VARIOUS HOISTS COMPARED. ELECTRIC HOIST

RECOMMENDED

BY J. A. MARSH\*

What hoist shall I use? That is the question that confronts every miner who has ore to bring to the surface. And this question has been a live, vital issue with every miner from time immemorial and continues to be a problem with most mines as long as they are in operation, and as depth increases, conditions change, or improved methods are made possible by the unending developments of mechanical progress.

**Hand Power.**—What was probably the original type of mine hoist, a primitive, home-made windlass over the pit mouth, is with us yet and will ever continue in use in remote regions for prospectors' exploratory work. The modern geared, high-power hand winch is a development from this original crude windlass and is used in many of the smaller mining operations, being the handiest and most effective mechanism for certain classes of work by reason of its light weight and the ease with which it can be transported.

**Horse Power.**—The next forward step in the evolution of the mine hoist was the horse power machine. This was in use for many years, and there is still an occasional demand for it, but it has largely dropped out of use because of its slow speed, the increasing cost of manufacture, and the introduction of other forms of power that can compete with the horse power hoist in weight and price and can easily excel it in speed. One great advantage of the horse power hoist is the cheapness of the power, and the fact that fuel does not have to be transported at great cost over difficult country, nor is it necessary to go to the expense of stringing wires for power purposes. However, in spite of this advantage in the use of horse power, the company with which the writer is connected has practically abandoned the manufacture of the horse power hoist owing to the increased cost of production, combined with the small demand, which raises the selling price to a figure higher than the average user of this class of hoist would care to pay.

**Gasoline Hoist.**—To offset this disappearance of the old-time horse power hoist, the modern small-sized gasoline mine hoist has made its appearance and is coming into favor in many kinds of small mines by reason of its low price, its light weight (making it easy to transport) and its speed and general efficiency in operation. In fact, the writer has known of this little gasoline hoist being used in coal mine work where one would naturally think of steam as being the only power by reason of the cheapness of the fuel. But, as will be noted elsewhere in this article, cheapness of fuel is not the only consideration, and even in the presence of such an abundance of potential power it is often found advisable to use power derived from some other source. These gasoline hoists for mine work are made usually in the smallest sizes only, seldom exceeding ten horse-power, and frequently much smaller, as they are designed for the use of the smaller mines only and for exploratory work, where

frequent transportation may be necessary, or for auxiliary power or special work round the larger mines.

**Steam Hoist.**—Steam power for hoisting has been in use for so many years and has proven its worth in so many and varied installations, that it is needless to give it more than passing mention here. It has been developed gradually through the years until several distinct types of steam hoists have been evolved and more or less standardized, and it is now possible to equip the mine with any size of steam hoist from the tiny ten horse-power machine right up through the various sizes of geared hoists to the mammoth "first motion" hoists in which the thrust of the piston is applied directly to the drum shaft. Many variations have been applied in the way of Corliss valves, automatic steam regulation, etc., to save the steam, give greater efficiency and minimize the wastage of power inevitable with the use of steam. But this will not be dealt with herein, as the main purpose of this brief article is to deal with some phases of a newer power which is lately displacing steam in mine hoists, viz., electricity, some of the many advantages of which are given below.

**Electric Hoists.**—In the first place, to quote an experienced mine manager who has had large experience with both steam and electric power for mine hoisting: "It is accepted that the steam economy of hoisting engines is necessarily poor owing to intermittent service." But this intermittent use of the hoist is not the only factor that tends to make steam a wasteful power for this purpose. As this same expert says: "In addition there are other causes that militate against steam economy, such as the start against full load; the rapid acceleration to full hoisting speed, requiring uneconomical admission of steam throughout practically the full stroke of the piston; the variation of load during short hoisting periods, together with the frequent stops for variable periods, during which the cylinders cool, etc." All the above mentioned conditions vary, of course, with the depth, the loads, and the type of hoist, and are minimized to some extent by the many refinements in valves, steam regulators and other devices on the larger and more expensive hoists, but which are of necessity omitted on the smaller hoists of simple valve design and low price.

The above represent only a few of the objections to steam power for the operation of mine hoists, all of which are overcome or at least bettered by the use of electric power. Some of the other points in favor of electric power for this purpose, rather than steam, are given below.

**Operation.**—The operation of an electric hoist is so simple that experience has proven that any man of ordinary intelligence can soon learn to run one, whereas an experienced man is required for operating a steam power hoist, and in most of the larger installations a man with a government certificate is required by the mining laws.

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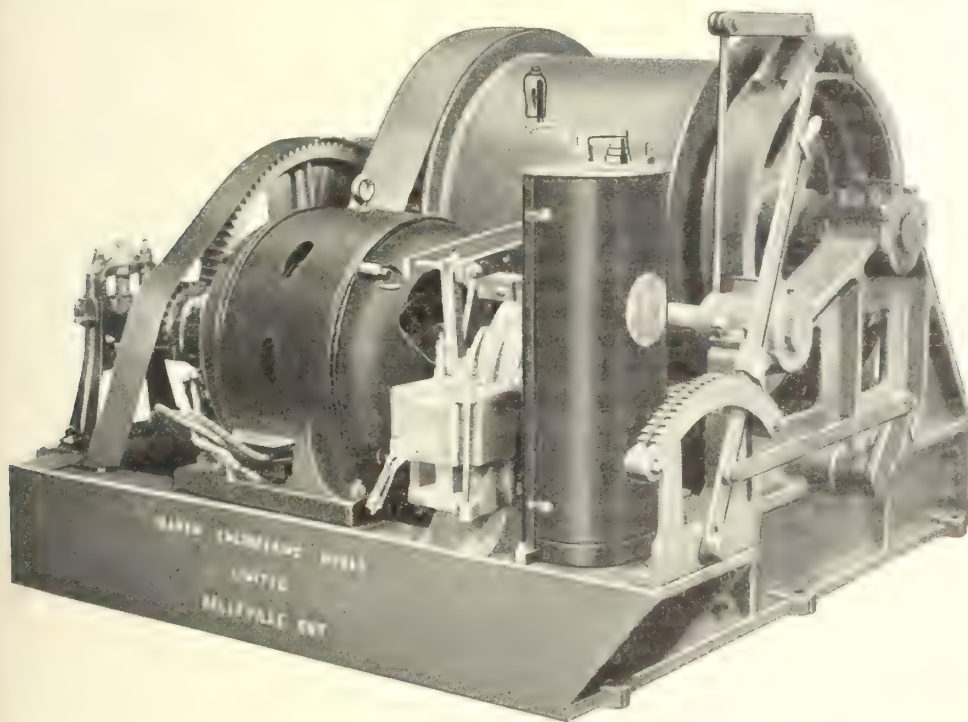


**Repairs.**—With an electric hoist there are no water or steam pipes to freeze and burst; no boiler tubes to burn and develop leaks in the hands of a careless fireman; no grates to burn out through neglect to remove the ashes from underneath; no cylinders or drip cocks to freeze in cold weather; no rivets or seams to become leaky when not properly cared for by the man in charge; no water or steam valves to get out of order; no water gauge glasses to break; in fact, none of the many well-known causes of repair bills incident to the use of steam power. In fact, as one electric hoist user says: "Our repairs are nothing to speak of."

**No Engines or Piping.**—By the installation of electric power the manager immediately removes an expensive item from his plant maintenance account. Only those who have had the care of engines and piping through all sorts of weather and under all the varied conditions of mine hoisting can appreciate what this means.

personal and costly experience: "Records of boiler repairs due to acid feed water are not available, but an average during my experience is that tubes in boilers must be renewed every six months, and further that constant boiler trouble results from the use of our mine water. We therefore consider that electric power is preferable." In this particular case (and there are probably many other mines situated as unfavorably, or even more so as regards their source of water supply) to procure an adequate supply of suitable water it would have been necessary to provide a pumping station and to lay from one and a half to two miles of water mains; and for a considerable portion of this distance it would have been necessary to blast out a channel in the rock to put the pipes below the frost. Under such circumstances it will be seen quite readily that the stringing of electric wires is much less costly and will give greater and more permanent satisfaction.

**The Electric Hoist Always Ready For Use.**—There is




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A typical Electric Mine Hoist of medium size with 40 inch diameter fixed drum and 40 H. P. Electric Motor, Solenoid Brake on the Motor and Post Brake on the Hoisting Drum.

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**Convenience Of Location.**—It is remarkably easy to instal an electric hoist. Just set it wherever you want it, string a couple of wires and make the simple connections required, and it is ready for use. There is no steam piping to instal, no condensation of steam and consequent loss of power from long pipe lines, and no bother trying to correlate the hoist and the steam supply. This convenience of location is also appreciated, perhaps to an even greater extent, when it becomes necessary to remove the hoist to another location, and this has to be done frequently at some mines.

**Boiler Feed Water Supply.**—The provision of an adequate supply of water of the right quality for use in the boiler is a vital necessity to every user of steam, and in some cases this is a very expensive item to meet. In not a few cases the main or only source of supply for this boiler feed water is the water pumped from the mine itself, and this is often so strongly impregnated with chemicals of one sort or another that it is entirely unsuitable for use inside a boiler. One mine manager reports from his own

no time wasted waiting for steam in the morning or at noon; no lost time during the day from low steam pressure, a lazy fireman, or a slow fire. There are no shut-downs from low water or any other of the many causes of trouble that occur at times in the use of steam power. With electricity the power is waiting and ready for you whenever you want to use it, ready to give you full capacity and to handle your full load at any time without warning or preparation.

**Electricity Cheaper in Operation.**—You pay for power only while it is actually in use, and the moment you cease using it your power bill stops its upward climb. When not actually hoisting, the only expense is the pay of the operator and interest on the investment. On the contrary, in using steam power the fires have to be kept burning, the boiler must be kept supplied with water; in short, with steam you are paying for power throughout the whole working day, even though it be used for only a fraction of the day. Furthermore, there is not the same tendency to wastage of power in the use of electricity as with



steam. This is more particularly the case where the boiler has to be set at some distance from the hoist, and the long pipe lines cause condensation of steam and consequent serious loss of power. As one mine superintendent has written: "We are obliged to have steam for other purposes, but if we had to carry steam any distance we would not consider a steam hoist up to the capacity of what we have." This company are using two electric hoists at their two mines, buying their power, but they find electricity so satisfactory that they say: "Even if we had the steam and were generating our own electricity we would use an electric hoist unless our boiler was close to the hoist."

**Ease of Control.**—Experience proves that the handling of an electric hoist is easier and simpler than with a steam hoist. There is no steam to condense in the cylinders, no drip cocks to look after, no steam pressure to watch, the operating levers are fewer, and many operators think the load is more easily picked up and more easily controlled in transit than with steam.

**Electricity is Cleaner.**—It is a nice thing to have the hoist room clean and tidy and to have the men in charge take pride in their work and in their spotless surroundings. It tends greatly to give men that contented, satisfied feeling that makes them permanent, dependable employees. With electric power this is much easier to accomplish than with steam as there is no water and grease dripping around, as is almost inevitable in the use of steam. This may at first sight seem but a minor matter, but on careful consideration its real importance will be more fully appreciated.

**First Cost and Operating Expense.**—First cost is, after all, a minor consideration, as the question of operating expenses is a much more important factor than the initial cost, and, as noted above, experience proves in the majority of cases that the operating expenses of an electric hoist are lower than for a steam hoist. As one mine manager puts it clearly and briefly: "We have about half a dozen of your hoists in actual use, and we are absolutely satisfied with them. We prefer electric hoisting to steam because, in our opinion, electric hoists are much more economical to use." Regarding initial cost, opinions vary as to the basis of comparison. If the boiler is included in the price of the hoist, the electric hoist is certainly cheaper—anywhere from five to fifteen per cent, depending on the make of motor used. But some claim this is not a fair comparison, inasmuch as the boiler is the power-producing plant, and it would be impossible to include the electric power-producing plant with the first cost of an electric hoist. Therefore, it is claimed by the holders of this theory that the steam hoist with its engines, but without the boiler, should be compared in price with the electric hoist with its motor, but without its power-producing plant. On this basis, with both hoists ready to receive and utilize their respective powers, the electric hoist is usually somewhat more expensive in first cost than the steam hoist, but this is soon offset by the reduced cost of operation.

**Electric Power Cheaper Than Steam Power.**—This is true for the majority of mines, and is a large factor in deciding many to instal electric hoists.

**Electricity Sometimes Preferred Where Fuel is Cheap.**—Take the case of a certain coal mine, for

instance. If there is any one place where one would naturally expect steam power to be used for hoisting, it is in a coal mine, where the abundance of cheap coal would make steam lower in price than electric power. But this coal mine (and there are doubtless others similarly situated) is now using electric power for its hoisting. After using steam hoists for a number of years and giving them a thorough test, they have abandoned the use of steam for this purpose and substituted electricity, even though they already had 6 or 8 of our steam mine hoists at work in their various pits. The explanation of this change of power is simple. First, their only source of boiler feed water of suitable quality is a couple of miles away from the mine. Second, frequent moving of the hoist is necessary, and it is cheaper to string electric wires than to lay water pipes each time the hoist is moved. Shafts are sunk 800 ft. between centres one way, and 600 ft. between lines. This gives an area of 800 by 600 ft. for each shaft. The average life of a shaft is about 18 months. When this area of 800' x 600' is exhausted, the shaft is abandoned; shaft houses, hoists and all equipment are taken down and set up at a new shaft. From these facts it will be easily seen that in this case electric power is less costly in the long run than steam, even though the fuel costs would be so low in the latter case.

As the above-mentioned coal mine has now nearly a dozen of our electric hoists in operation, their experience should be of value to others; hence, the following extract from a letter recently received from their manager will be read with interest by all mine managers who are now considering the problem of what power to use in hoisting:

"We consider electric power is preferable, due to its flexibility in the transmission of power, by stringing wires, and because changes are made from one shaft to another at less cost than would be the case if steam were used with its consequent expense for water lines, or for repairs if mine water was used. This leaves aside the question of boiler failures which used to be of frequent occurrence.

"To sum up briefly, our reasons for the change were:

1st— We installed an electric power plant primarily to operate mining machines.

2nd— Having electric current available, we changed to electric hoists owing to their greater flexibility and ease of operation.

3rd— To avoid installing and maintaining a water supply of suitable feed water.

4th— To reduce expenditure for upkeep and renewals for boiler repairs due to use of acid water. Our records show a net saving of approximately \$3000 per annum for these items.

5th— Economy in fuel, power being generated at one plant, and use of current being spread over all our operations, intermittent operation is not so important. Our central boiler plant is up-to-date as to its heating of feed water and superheating of steam, and is under skilled supervision in the use of fuel, which was not possible the case of detached small units."

The above points in favour of electric power for hoisting are not, of course, arranged in order of merit as regards their relative importance. In fact, it would



be impossible to so arrange them, since owing to the varying conditions in mines, what would be a deciding factor for one mine would be a matter of minor importance in another mine. Nor is the above an exhaustive list of the arguments in favour of the electric hoist. There are others; but it is probably better not to exhaust the subject rather than to exhaust the reader by dilating on the subject. From the information given above one can readily understand why so many mine managers, when confronted with the question at the beginning of this article: "What hoist shall I use?" are deciding in favour of the electric hoist.

### PERSONAL AND GENERAL

Mr. Thos. Riggs, who was formerly Governor of Alaska and is now vice-president of the Continental Mines, has been visiting the company's properties in Cobalt and Kirkland Lake.

Mr. A. W. MacDonald, Superintendent of the Industrial Department, Dominion Coal Company has just returned from a business tour of certain of the European countries. He reports labour conditions in some of these countries as far inferior to those of Canada, due to a large extent to the post-war strikes.

Mr. R. A. Bryce, of Toronto, has been making a trip to Porcupine and Kirkland Lake.

Mr. Horace Young has gone to Porcupine to take charge of the Moneta property.

Mr. Cyril Knight has returned to Toronto from Cobalt, where he is still engaged in his examination of the silver mines.

Mr. W. P. Alderson has left Montreal for the Quebec gold field, where he will direct the exploration of two groups of claims held by a syndicate of which he is a member.

Mr. D. H. MacDougall is in Montreal from Sydney, where he has been very successful recently in coping with the labour problem.

Mr. N. A. Timmins, on his return from London, has stated it as his opinion that the unfounded rumours about the sale of the Hollinger mine to British investors had been put in circulation deliberately by men interested in the public sale of certain Porcupine mining stocks, with a view to using the Hollinger's record to promote their sale.

Mr. Palmer J. Cook, formerly in charge of the Midas mine at Valdez, Alaska, is now superintending the operations of the Granby company on the Outsider Group, near Maple Bay, Portland Canal district.

The season's dredging in the Yukon was commenced last week by one of the Burall and Baird dredges, and the others will follow rapidly. Hydraulic mining promises to assume greater dimensions this year than last.

Two weeks ago grading was commenced on the ground where the new copper concentrator at Anyox is to be erected. Work on the new dam was resumed at the same time.

The impending scarcity of fluorspar of commercial grade has induced numerous large users on this continent to acquire deposits of the mineral for future use. Cryolite is the only alternative source of fluorine, and it is available even less readily than is fluorspar.

### NOVA SCOTIA COAL FOR QUEBEC PROVINCE

The possibility of using the coal measures of Nova Scotia much more largely than at present to supply the needs of Quebec, and possibly part of Ontario, is engaging a good deal of popular attention just now. The reported acquisition of coal areas and the express intention of the Department of Mines at Halifax to investigate thoroughly the maximum productive capacity of the province's coal measures, lends added interest to the question. In this connection it is interesting to note the information given by Mr. F. W. Gray of the British Empire Steel Corporation before the Senate Committee on Fuel Supply in Ottawa recently.

In reply to the question as to how much coal Nova Scotia could supply for Canada's need and whether coke could take the place of anthracite Mr. Gray said, "I think there would be no difficulty at all in Nova Scotia supplying all the coal that Quebec at least, and probably Ontario, would need in the way of coke as an equivalent for anthracite. I might say I have used Sydney coke all winter at Ste. Anne's. I would rather have it—much rather—than anthracite. It is less trouble; it is less expense." Mr. Gray stated further that the coke had about the same heating value, and that he would be willing to pay more for a ton of coke than for a ton of anthracite.

In referring to the possibility of the British Empire Steel Corporation establishing by-product coke ovens in Montreal, Mr. Gray stated that the investment involved would run from three to five million dollars for a sixty-oven plant with a capacity of 1000 tons of coke a day. "Of course, the old line gas plant has been entirely superseded by the by-product coke oven. You can make better gas and more of it, and get a greater recovery of by-products from the modern by-product oven than from the old-fashioned retort gas works. They are out of date. I might say, too, that there is no comparison between gas-house coke and by-product coke. In the gas works your object is the destructive distillation of coal to obtain gas; in by-product coke your object is to get a high-carbon fuel. The coke oven has, I think, entirely superseded the gas plant where coal alone is used. Water gas is a little different."

Cape Breton coal, Mr. Gray stated, would give a 64 per cent yield of coke, two or three gallons of benzole, ammonium sulphate in unusually large quantity, and tar of peculiar value. Nova Scotia coal is known to be particularly rich in by-products. It is high in sulphur, too, but this is not an insuperable objection as it can be removed economically.

The great improvement in by-product oven practice during recent years was well illustrated in the evidence. It requires no more than 100 men to run modern ovens producing 1000 tons of coke a day, which is about one-quarter the number required with older types. To-day a mechanical pusher empties the oven into a steel car, where quenching breaks it up sufficiently to discharge it on a belt conveyor, which takes it to bins or stock piles.

One of the most important effects of the use of Nova Scotia coal for domestic fuel, via the coke oven, would be the steady effect it would have on the mines, Mr. Gray explained. To supply the Island of Montreal would require a million tons a year. With this to depend upon each year, the coal operators would have what they have always lacked heretofore—a dependable market. The railway contracts for coal from Nova



Scotia are never certain, they are awarded to American mines if they can undercut our own mines in price, and the operators in Nova Scotia must meet these prices or lose the railway custom.

Nova Scotia's chief competitor is not the old producing states, Pennsylvania, Illinois and Ohio, where the cost of mining has gone up much as in Nova Scotia, but West Virginia, where coal is mined to-day more cheaply than anywhere else in the world. It is a new field with new seams. One advantage Nova Scotia does possess, however, and that is water transportation. A fair estimate of the cost of carrying to Montreal and discharging there is a dollar a ton. Eventually, after Nova Scotia has captured the whole of the Quebec market, it may be profitable to try to gain part of the Ontario market, in spite of the present necessity for lightening ship before going through the St. Lawrence canals.

"This year", said Mr. Gray, "we hope to put almost as much coal into Montreal as we have ever done. It has taken a long time to get that market back. Last year was abnormal because of the strike in the United States. Prices will be lower this year than last because coal will be more plentiful. We hope to put up the St. Lawrence nearly too million short tons this season."

### NATIONAL MINING CORPORATION IN PORCUPINE

At the annual meeting of the National Mining Corporation in London three weeks ago, the company's interest in the Porcupine gold field was discussed. With the New Consolidated Goldfields, an interest was bought in a number of Porcupine properties, one of them adjacent to the Hollinger, Mr. J. B. Tyrrell being the agent in Canada. An active search for other promising properties is to be carried on.

### CANADA'S MINERAL COMMERCE

(By Dr. Charles Camsell, Deputy Minister of Mines, in "Natural Resources.")

Canadians have long been taught and accustomed to place mineral resources in a high rank among the Dominion's industrial assets, and, on that account, perhaps the greatest surprise that greets anyone who has had little occasion to study the national trade balance is the fact that Canada is heavily a debtor country in regard to mineral products. The formidable sum of more than \$190,000,000 is the amount by which the value of exports of mineral commodities during the past year has fallen short of meeting the bill for mineral purchases abroad.

The Canadian trade returns include three broad classes of commodities which are wholly or mainly of mineral origin: (1) iron and steel products; (2) metals other than iron, such as copper, tin, and the precious metals; (3) non-metallic minerals, such as coal, oil, asbestos, glass, and clay products. It should be noted that each main class includes highly manufactured articles as well as ores and other mine products in raw state. Altogether Canada's imports under these three broad classes of merchandise amounted to roughly \$307,000,000, while the total sales to other countries aggregated about \$115,000,000. Thus on this group of

foreign commerce items there was incurred a national trade deficit of \$192,000,000.

The above figures, and those in the following table, are taken from the external trade records as published by the Dominion Bureau of Statistics for the twelve months ending February, 1923:—

| Commodity Groups.     | Imports.      | Exports.      | Favourable or adverse balance. |
|-----------------------|---------------|---------------|--------------------------------|
| Iron and its products | \$134,162,000 | \$ 47,598,000 | —\$ 86,564,000                 |
| Non-ferrous metal     | 36,684,000    | 41,854,000    | +5,170,000                     |
| Non metallic minerals | 136,955,000   | 26,017,000    | —\$110,938,000                 |
|                       | \$307,801,000 | \$115,469,000 | —\$192,332,000                 |

This net showing of Canada's commerce in mineral commodities does not appear to do full justice to the capacity of the Dominion to attract and support mineral industries of both basic and secondary character. It is true that the Dominion's mining industries have made great advances, that last year's trade does not furnish an altogether fair index, and that a large part of the huge excess of imports over exports is accounted for by heavy foreign purchases of highly manufactured goods of mineral origin. But, making due allowance for all such factors, there seems to be ample scope for efforts aimed toward strengthening Canada's trade position through the development of mining industries.

Viewed in the light of the Dominion's commercial balance sheet, it is doubtful whether any single class of natural resources now merits closer study than mineral areas as the foundation on which to build new Canadian development. Wheat lands and pulpwood areas have in turn attracted huge extensions of industry during the past quarter of a century. The growth which they have supported has vastly enhanced Canada's standing as a creditor country in regard to such commodities as cereals, lumber, and paper, but that same growth has incidentally served to accentuate very sharply the country's debtor position with respect to iron and steel goods, coal, oil, and mineral products in general.

Time and again mention is made of the remarkable rise of Canada's wheat and other cereal exports, and to the vital part they play in righting the Dominion's balances abroad. It is seldom realized that a great portion of the surplus created by cereal exports is offset by the bills for mineral purchases.

Comparing the external trade of Canada in 1922 with that of the year 1902 it will be observed that there has been a huge growth in both import and exports, but that commodities of mineral origin accounted for only about 10 per cent of the total increase in sales, as against nearly 40 per cent of the increase in value of national purchases abroad. Anyone who is at all conversant with the nature and extent of the Dominion's mineral possibilities must share the view that the course of our commercial progress in the coming years can and should be shaped in such manner as to reduce rather than to swell the annual deficit from our trade in commodities of mineral origin. So far as its facilities and resources permit the federal Department of Mines is sparing no effort to attain this objective and to bring Canada's mineral resources into greater use.



# NEWS AND COMMENTS

By ALEXANDER GRAY

## Robinson Mine

*Chevalier d'Industrie!*

Were it the practice among Anglo-Saxons and their racial offshoots to bestow honors and titles upon other than individuals, it would be entirely appropriate to enroll the Robinson gold mine at the Witwatersrand.

Soon the Robinson will be a memory — cherished by those who knew it, appreciated its management, understood it to be one of the guidons of that gold industry, the greatest of its kind, whose technical chiefs wrote thus in their memorial to the Right Honorable Joseph Chamberlain when he visited the Witwatersrand in 1902:

"Gold-mining as a business in other parts of the world has been recognized as the acme of speculative investment. Here, though capricious as units, the mines are, as a whole, regular within certain fixed limits; and it is perfectly true that greater reliance can be placed on the continuance of the deposit than has ever been known in gold-mining, and, therefore, large preparatory outlays on the basis of a staple industry are more justifiable."

It was at the Robinson, in 1890, that the first cyanide test works established that process without which the banket ores of the Witwatersrand might not have been brought to their true destiny. In 1885 the first gold was panned from the banket conglomerates of the Rand. Two years later there was a pilot stamp mill. Three years afterward, the adaptation of cyanide to the treatment of the banket by the Robinson technical chiefs precipitated the bitter struggle with Glasgow metallurgists that resulted in a victory for the gold industry. The following year chlorination was attempted at the Robinson. Lawyers and courts contested the claims of the MacArthur-Forest people to exclusive rights in what was the practice in Phoenician times. It was life or death with the gold industry, where the ore was comparatively low-grade even though consistent.

Of the rôle played by the Robinson on behalf of the industry, through the demonstration of the efficiency of treatment by cyanide, the combined technical chiefs also said to Mr. Chamberlain:

"One of the early difficulties was the unsatisfactory extraction of gold from the ore. At first, not more than 50 to 60 per cent was obtained by the amalgamation process; later on, concentration and chlorination of concentrates improved matters; but it was not until the chemical treatment of all the sands and slimes by the cyanide process was introduced that satisfactory results in this regard were reached. Now it may be said that the average well-equipped mine can recover 85 to 90 percent of the gold contents of its ore."

That percentage upon which the Messrs. Jennings, Pope Yeatman, George E. Webber, Harry H. Webb, S. C. Thomson, G. A. Denny, Fred. Hellmann, W. L. Honnold and others prided themselves twenty years ago, would cause trouble in many a board room if not bettered to-day. Cyanide practice as further developed at the Robinson led to those supplements in modern metallurgy by means of which lower grade ores yield more and more of their precious metal contents. And it was at the Robinson that the first filter presses were introduced.

So the information that the Robinson Directors have decided to suspend dividends — only 1½ per cent on issued capital having been earned in the past fiscal year — carries with it more than a pang. The Robinson, one of the galaxy of beauties along the outcrop, is "in extremis".

The Robinson began production in 1888. To the end of last year (34 years) its crushing record was 11,500,000 tons for a total gold output of 5,723,044 ounces — approximately half an ounce per ton milled. The dividends from that tonnage totalled £11,980,938. Estimating the gold at its parity, the total production was worth approximately £24,309,946; including the premium it was worth £24,600,000, say \$130,000,000, taking the pound at \$5. About one half this grand total was expended on production, and that illustrates the benefits resultant from such mines. Nor does that include capital expenditure.

For over a third of a century the Robinson milled its millions. Beginning in 1887, when part of the farm Turffontein was acquired, it is interesting to note for the information of vendors of now-a-days that in 1889 six Main Reef claims were purchased, along with 100 acres of land, for £15,500 in cash and 3,375 shares of £1. That synchronized with the adoption of cyanide practice.

So mining engineers in all countries will pay their respects this year to the grand and glorious old Robinson.

\* \* \*

## Labrador Misrepresentations Re-Act

Not only has one officer of a Labrador Gold company denounced an alleged discoverer of the placer fields as a man who should be serving a life sentence, but here is an admirable protest by a man who was misquoted regarding those fields, and who has the courage to tell the truth, the whole truth, and nothing but the truth:

I have been quoted in a prospectus of one of the companies offering for sale mining locations in Labrador, to the following effect: "I have spent twenty-five years of my life in Labrador region and I have seen the Indians bring down considerable quantities of gold nuggets. I am the owner of a large number of claims, which I propose working thoroughly this coming summer. None of my holdings are for sale, but I can truthfully say, secure every possible claim you can in Labrador." I wish to say that the writer of the above, to say the least, has drawn very much on his imagination. I have never made such a statement. I have not spent my life looking for gold. I do not know Labrador thoroughly; it is too extensive for one man. I do know of one Indian that did bring out a piece of gold, but I do not own one claim in Labrador, though I have had assays made here in Montreal and, very much to my surprise, did get gold, from sand taken by myself. As I do not wish that anyone should be led to purchase a claim on what I am wrongly reported to have said, will you please insert this denial in your paper. —F. C. CREAN, 234 Board of Trade Building.

The foregoing appeared on the editorial page of "The Star" of Montreal, on May 8, among correspondence.



As "The Star" was hampered by the chief culprit, the statements of Mr. Crean deserved more prominence. Who is going to run to earth and expose this whole affair, and punish whoever is guilty of wrongdoing? The Government of Newfoundland remained passive while the advertisements making all sorts of claims were enticing the adventurous public. Premier Faserchew has declared Quebec will not allow suspicious propositions to be foisted on the public. Meanwhile hundreds of thousands of dollars have been handed over to promoters, and one of the chief culprits is said to have left these parts for a healthier climate in New York.

### "Another Hollinger" — Not Quite!

An outstanding firm of Chartered Accountants certifies to the following balance sheet of **Canadian Associated Goldfields Limited**, as at December 31, 1922.

| LIABILITIES                                                                                                                                                                                                |                 |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| Capital                                                                                                                                                                                                    |                 |
| Authorized 10,000,000 shares of \$1.00                                                                                                                                                                     | \$30,000,000.00 |
| Issued (Trust Receipts for 21,934,096 shares of \$1.00 each, fully paid)                                                                                                                                   | \$21,934,096.00 |
| Contracted and Accrued Liabilities                                                                                                                                                                         |                 |
| Accounts Payable . . . . .                                                                                                                                                                                 | \$10,569.89     |
| Wages Accrued . . . . .                                                                                                                                                                                    | 3,657.19        |
|                                                                                                                                                                                                            | 14,227.08       |
| Unassigned Liabilities                                                                                                                                                                                     |                 |
| (None Assigned)                                                                                                                                                                                            |                 |
| Total . . . . .                                                                                                                                                                                            | \$21,948,323.08 |
| ASSETS                                                                                                                                                                                                     |                 |
| Fixed Assets                                                                                                                                                                                               |                 |
| Mining Properties, Larder Lake, including Development, Timber Limits and Power Rights, of Huron, Pains and Wendigo, at value to which acquired (Satisfied in part by the issue of Capital Stock) . . . . . | \$20,988,398.21 |
| Tools and Machinery . . . . .                                                                                                                                                                              | 149,483.41      |
| Horses, Wagons, Etc. . . . .                                                                                                                                                                               | 1,994.43        |
| Office Furniture and Fixture . . . . .                                                                                                                                                                     | 1,968.28        |
|                                                                                                                                                                                                            | 21,141,844.33   |
| Current Assets                                                                                                                                                                                             |                 |
| Cash on Hand and in Banks . . . . .                                                                                                                                                                        | \$249,921.85    |
| Due from (Various) Bonds . . . . .                                                                                                                                                                         |                 |
| Prepaid and Accrued Interest . . . . .                                                                                                                                                                     | 212,858.38      |
| Accounts Receivable . . . . .                                                                                                                                                                              | 4,880.96        |
| Inventory of supplies . . . . .                                                                                                                                                                            | 50,018.46       |
|                                                                                                                                                                                                            | 417,679.65      |
| Development and Office Expense (1921-1922)                                                                                                                                                                 |                 |
| Stamping . . . . .                                                                                                                                                                                         | 302,609.99      |
| Wendigo Power Rights . . . . .                                                                                                                                                                             | 22,392.94       |
| Office and Miscellaneous . . . . .                                                                                                                                                                         | 32,741.04       |
|                                                                                                                                                                                                            | 357,743.97      |
| Total                                                                                                                                                                                                      |                 |
| Interest on Bank Balances and Investment . . . . .                                                                                                                                                         | \$52,215.59     |
| Power Sales . . . . .                                                                                                                                                                                      | 16,729.37       |
|                                                                                                                                                                                                            | 68,944.87       |
|                                                                                                                                                                                                            | 288,799.10      |
| Total                                                                                                                                                                                                      | \$21,948,323.08 |

| The Shareholders                                                                                                                                                                                                                                                                                                                                                                                                                                  |  |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| Canadian Associated Goldfields Limited,<br>Toronto, Ont.                                                                                                                                                                                                                                                                                                                                                                                          |  |
| As instructed we have audited the accounts of Canadian Associated Goldfields Limited, for the period from October 1st, 1921, to December 31, 1922, and have prepared therefrom the above Balance Sheet, as at December 31, 1922, which in our opinion correctly reflects the financial condition of the Company as at that date according to the best of our information, the explanations given to us, and as shown by the books of the Company. |  |

MARWICK, MITCHELL & CO.,  
Chartered Accountants,  
Toronto, April 11, 1923.

If that be a true and correct valuation of the assets of Canadian Associated Goldfields Limited, then there is no limit to the extent to which a mining corporation

can pervert the truth. According to it, the 21,934,096 shares, or trust receipts outstanding, have a face or nominal value of about 97 cents each. Private sales are reported at from 9 to 15 cents. What is the worth of an audit under such circumstances? To value the Associated properties and plant, timber and water power rights at almost \$21,000,000, is making an expensive plaything of higher mathematics. Current assets are \$164,941 less than they were in the year ended October 31st, 1921. The increment from bank balances, investments and the sales of power increased from \$35,044.21 to \$68,944.87, which is partly accounted for by the fact that the balance sheet covers a fourteen months' period. Those who know the facts hardly can concur in the opinion that the statement reflects the actual worth of properties, power and paraphernalia combined.

### WORLD'S GOLD AND SILVER PRODUCTION FOR 1922

The American Gold and Silver Institute estimates the world's gold production during 1922 as 14,841,136 ounces, valued at \$306,793,000, as shown in the following table:

|                 | 1922          | % of world production in 1922 | % of increase (plus), decrease (minus), 1922, from 1915 |
|-----------------|---------------|-------------------------------|---------------------------------------------------------|
| United States   | \$ 49,096,000 | 15.9                          | 51.4 minus                                              |
| Canada          | 25,447,000    | 8.3                           | 34.1 plus                                               |
| Mexico          | 15,500,000    | 5.1                           | 136.3 "                                                 |
| North America   | 90,043,000    | 29.3                          | 28.9 minus                                              |
| Central America | 2,000,000     | 0.7                           | 32.7 "                                                  |
| South America   | 11,000,000    | 3.6                           | 27.1 "                                                  |
| Europe          | 600,000       | 0.2                           | 97.9 "                                                  |
| Australia       | 20,000,000    | 6.5                           | 59.2 "                                                  |
| Asia            | 19,500,000    | 6.4                           | 30.6 "                                                  |
| Africa          | 163,650,000   | 53.3                          | 24.9 "                                                  |
|                 | 306,793,000   | 100.0                         | 34.5 minus                                              |

The production of silver is similarly estimated as follows:

|                 | (ounces)    | % of world production in 1922 | % of increase (plus), decrease (minus), 1922, from 1915 |
|-----------------|-------------|-------------------------------|---------------------------------------------------------|
| United States   | 55,510,000  | 28.7                          | 29.2 minus                                              |
| Canada          | 17,612,000  | 9.1                           | 50.8 "                                                  |
| Mexico          | 81,202,000  | 42.1                          | 63.0 plus                                               |
| North America   | 154,324,000 | 79.9                          | 7.4 minus                                               |
| Central America | 2,000,000   | 1.0                           | 31.5 "                                                  |
| South America   | 10,000,000  | 5.2                           | 10.1 plus                                               |
| Europe          | 8,000,000   | 4.1                           | 20.9 minus                                              |
| Australia       | 9,000,000   | 4.7                           | 119.8 plus                                              |
| Asia            | 8,860,000   | 4.6                           | 62.0 "                                                  |
| Africa          | 1,040,000   | 0.5                           | 2.2 minus                                               |
|                 | 193,224,000 | 100.0                         | 2.0 minus                                               |

During the first three months of 1923, the collieries of the United States have produced 138,600,000 tons of coal. This is 30 per cent. in excess of the production of the corresponding period in 1921 and 1922, and only 3 per cent. less than the record year, 1920.

# The Mineral Districts of British Columbia

A DIGEST OF INFORMATION FROM THE 1922  
REPORTS OF THE RESIDENT MINING  
ENGINEERS

Figures given in the Annual Report of the Minister of Mines of British Columbia place the total value of the mineral production of that Province from 1852 to 1922 inclusive at \$769,418,462. Coal mining has produced \$238,289,565, more than any other separate class of mining; next comes copper with \$170,723,242 while lode gold is third with \$109,647,661 and placer gold fourth with \$76,542,203.

The southwestern district of the Province, including Vancouver Island and the southern mainland coast section, leads others in point of production. It is followed, in the order named, by the Northwestern, Eastern, Southern, Central and Northeastern Districts. The Southwestern and Eastern Districts owe a substantial proportion of their output to their coal mines. In other sections production is almost entirely from metal mines.

It is shown that the metal mines produced 1,573,186 tons of ore in 1922, having a gross value of \$19,231,857 and with the placer gold a total value of \$19,596,657.

## Gold

In analyzing the placer mining situation, the production from which last year shows an increase of over 56 per cent, it is pointed out that practically all the production came from the northeastern and northwestern districts. An approximate apportionment is interesting as follows: Cariboo, \$190,300; Atlin, Stikine, and Liard, \$149,000; the remainder \$23,500. In the past four or five years placer mining output has dropped from between \$500,000 to \$700,000, attributable largely to economic conditions with which all are familiar. The encouraging showing of last year is due to the production of the newly opened up diggings on Cedar Creek, Cariboo.

There was a 45.9 per cent increase in lode gold output, the Portland Canal Division, in which the Premier Mine is situated, being responsible for a gold value of \$2,553,303, or more than the remainder of the Province. The Belmont-Surf Inlet Mine produced \$725,124 and the Osoyoos Division, within which area is the Nickel Plate Mine, produced \$370,365. The Rossland Camp produced \$170,651, less than 20 per cent of normal, as these mines were shut down in March, pending the preparation of a concentrating plant at Trail.

The increase in silver output of 4,427,922 oz., is explained by the phenomenal showing of the Portland Canal Division. Of the total provincial production of 7,101,311 oz., no less than 4,264,228 oz., came from this section, practically all of which was from the Premier Mine. The Slocan's output was 1,104,628 oz., that of the Fort Steele Division, 956,028 oz., and that of Nass River, 400,000 oz.

Copper, lead and zinc already have been dealt with but it is interesting to note with regard to copper that the Granby Consolidated Mining, Smelting & Power Co. produced 93 per cent of the provincial total for 1922. The other 7 per cent was about evenly divided between the Belmont-Surf Inlet Mine, the Rossland Camp, and

the Tidewater Copper Co. on west coast of Vancouver Island.

## Non-Metallic

The production of building materials has advanced in value from \$1,903,799 to \$2,533,926. Attention is directed to the amalgamation of the two well-equipped cement manufacturing plants situated on Saanich Inlet, Vancouver Island, under the name of the B. C. Cement Co. This concern made a production last year of over \$1,000,000. On the Coast, chiefly between the Island and the Mainland, there are a number of quarries actively engaged in taking out granite, sandstone and andesite, all of excellent quality. These quarries supply the stone building material of the Coast cities and also have exported to the United States. Firebrick and lime are largely produced, and for making the latter a new and extensive plant was erected at Blubber Bay a few years ago. The limestone used is of exceptional purity. Lime and limestone values for last year are placed at \$400,864 as compared with \$299,191 in 1921. A small proportion was used as smelter flux by the Granby and Consolidated companies and a large quantity was quarried by the paper and pulp mills for their own use.

For convenience in administration British Columbia has been divided into six mineral districts and over each is a mining engineer whose duty is to assist in development by recommending, where prospects merit it, expenditures on roads and trails, and to offer advice to operators and prospectors when the same is sought. Each of these engineers is heard from officially once a year through the Annual Report of the Minister of Mines. Their comments on progress and general conditions, and their reports on individual properties, are extremely interesting in parts and certainly warrant brief review.

## Northwestern District

George Clothier, of the Northwestern District, divides his territory geologically into the "Coast Range Belt", the "Eastern Contact Belt" and the "Western Contact Belt." He states that the growing importance of the "Eastern Contact Belt" was emphasized in 1922 by the "remarkable output and profits of the Premier Mine in the Salmon River section." This mine produced nearly as much gold and nearly double the amount of silver of the whole Province in 1921. This Belt has been explored, he asserts, only in a few spots and he stresses the importance of trails to make it more accessible. "It took fifteen years," he declares, "from the discovery of the Premier until it was a producer and it therefore behooves us to look ahead that length of time in opening new fields for prospecting."

Mining has been much stimulated by the present stable or rising metal markets and more properties have been under development. Some of those upon which work is under way are cited and Mr. Clothier, doubtless having in mind the certainty of excitement and consequent speculation in the Portland Canal Division this year, directs special attention to the provisions



of British Columbia Statutes relative to the filing of prospectuses with and for approval by such companies as propose selling stock to the public, and also of the obligation placed upon one giving a bond or option on a mining property to insert a clause in the agreement that those employed on the property shall be paid semi-monthly and that security for wages shall be deposited with the Government Agent or Mining Recorder.

### Northeastern District

J. D. Galloway, of the Northeastern District, points to the development of properties on Hudson Bay Mountain, near Smithers, as one of the outstanding events of the year in that section. Most encouraging results were obtained in the operations on Dome Mountain in the Babine Range and it is becoming more evident that this is an important mineralized zone that has been little prospected. On Rocher Debole Mountain the copper properties remain inactive and the mine of that name, closed down for some years, is not likely to be reopened until the market improves. The Silver Standard Mine near Hazelton was opened for about three months and then again closed down.

The remarks of Mr. Galloway on the Cedar Creek placer mining and on the possibilities of this form of mining elsewhere in his district, are worth quoting.

A very marked revival in placer mining has been evident in the Cariboo and Quesnel Divisions. The important discovery of Cedar Creek camp (discovered in late fall of 1921) has aroused considerable interest and during the summer there was a great influx of prospectors. Much misinformation was published in the daily press about the Cedar Creek discovery and as a result many persons rushed into the country who knew nothing about prospecting or mining. Most of this type soon left the district again and spread pessimistic stories that the Cedar Creek discovery was a fake. The truth is that a strike of very rich placer ground was made at Cedar Creek and that the work done during 1922 has exposed richer ground than the discovery, and that the deposit of auriferous gravel is likely to have a considerable areal extent. Gold to the amount of approximately \$125,000 has been taken out during 1922, mainly by means of rockers, so that it is quite evident that the discovery is one of some importance. The placer deposit at this point is somewhat unusual, as it differs in many ways from the old workings of the Cariboo, and therefore should be of great value as an indicator for this section of the country and should stimulate renewed prospectings.

"Much Keystone-drilling of placer gravels has been carried out in the Cariboo during the year with satisfactory results in places. On the result of such testing will depend the future of the older and formerly worked parts of the Cariboo. It is probable that many areas of low-grade gravels will pay to work if properly handled. Placer mining of this nature calls first of all for thorough testing of the ground to determine values and physical conditions; and, secondly, for sufficient capital for the equipping of the property. Besides the operating companies there are at the present time in the Cariboo district a number of companies doing large-scale placer mining and there is still much ground left that at least warrants preliminary testing to see if it will not pay to work by dredging or other methods."

### Central District

It is pointed out by A. W. Davis that the Central District, upon the mineral development of which he

keeps a watchful eye, is the most important of the Province as a future source of non-metallic minerals. Large deposits of gypsum, magnesium sulphate, magnesite, sodium sulphate and sodium carbonate are found and some are near railways. While, with the exception of gypsum, these have not at present a large market, it is thought that the condition cannot continue indefinitely.

Mr. Davis recommends that prospectors might pay more attention to his territory with profit. He also suggests that small operators would be benefited by grouping their properties and reorganizing under one head. On Cadwallader Creek there are four small mills with a capacity of from 10 to 20 tons a day each. Were these replaced by one modern mill of larger capacity, the result would be one overhead cost instead of four, cheaper milling, and an increased saving in values.

Interest in placer mining has increased although there has been no large production. On one property, the British Columbia Alluvials Ltd., operating on Bridge River, an extensive campaign of construction has just been completed. This plant is expected to be operated successfully this year.

### Southern District

Philip B. Freeland, of the Southern or Boundary District, first refers to the fact that there was no copper production in this section last year, but goes on to tell of the prospective operation of the Copper Mountain by the Granby Company. There were 4,616 tons more shipped from the district than in 1921. The increase in output of silver and lead is accounted for by high-grade silver-lead properties at Beavercreek. These veins are persistent, a large amount of plant has been installed and a greater tonnage production this year is predicted. Regarding the Rock Candy Mine of the Consolidated Mining & Smelting Co., Mr. Freeland points out that there was a lower output of fluorspar and states that this was the result of strikes in the steel and coal industry of the United States. He adds: "The deposit at Rock Candy Mine has become siliceous in the face of the two drifts, but there is still a considerable tonnage at the lower elevations. The high silica content hinders successful concentration."

Referring to the Hedley Gold Mining Co. it is stated the mine was active the greater part of the year, that a total of 41,286 tons of ore was mined and treated, making 1621 tons of concentrate and 511 tons of arsenic, in addition to the gold content extracted by cyanidation. Operations ceased in the late autumn because the cold interfered with power generation.

### Eastern District

The silver-lead-zinc industry of Eastern British Columbia is said by A. G. Langley, engineer for that section, to be in a healthier condition than it was prior to 1922. This has been due to improved smelter rates and the acceptance of zinc ores and concentrate by the Trail Smelter. Two events are selected as of special importance, one the construction of the 1500-ton concentrator at Kimberly for the treatment of the ores of the Sullivan Mine and the other the completion and successful operation of the Silversmith concentrator at Sandon.

Increase production from the district in and around Sandon is referred to and Mr. Langley finds it gratifying to note that the old Slocan Star, under the management of the Silversmith Mines Ltd., after a period



of comparative inactivity, again has been established as the leading producer of the Slocan. He says, too, that the output of mining companies has been supplemented by that of leasers, who have been unusually active. It is pointed out as noteworthy and a fact that speaks well both for the richness of the ores and mining conditions, that ore can be mined profitably by leasers with small capital who rely on their shipments to pay good wages after deducting all expenses, including a royalty of 15 or 20 per cent.

### Western District

Wm. M. Brewer, of the Western District, mentions that there has not been much metal production in this section because the Britannia Mine was idle, the Marble Bay Mine, Texada Island, has been closed down, the Tidewater Copper Co. was inactive through lack of water for power purposes, and the Sunloch and Old Sport properties, Vancouver Island, were not developed by the Consolidated Mining & Smelting Co. This last is explained by the low price of copper.

Notwithstanding all this, Mr. Brewer optimistically points to the reconstructed Britannia plant, to the satisfactory development of the Tidewater, and to other indications in support of his belief that 1923 will see an increase in the production of copper, silver and gold. He also dwells at length on the activity of the coal mining industry of the Island.

### VOLATILIZATION OF SILVER AND ZINC

Numerous experiments with the volatilization of silver chloride from argentiferous ores have been conducted at the Salt Lake City and Berkley, California, experiment stations of the United States Bureau of Mines. In addition to experimentation on ores, research was done along physico-chemical lines. The investigations included the determination of the vapor pressure of the silver chloride at various temperatures; also an examination of the hydrolysis of silver chloride by water vapor, resulting in the formation of metallic silver. Approximate determinations were made of the equilibrium, at various temperatures, between silver chloride, water vapor, and hydrochloric acid. The temperatures at which several common minerals of silver were oxidized or disassociated were noted.

From the results of the last-mentioned experiments it seems that the roasting of silver minerals tends to produce metallic silver. Chloridizing roasting of silver minerals, therefore, is essentially a problem of chloridizing metallic silver and subsequent volatilization of silver chloride. In the furnace, conditions must be maintained that prevent the silver from being hydrolyzed and from reverting to the metallic state before passing from the ore as silver chloride during volatilization. After further study a detailed report covering these experiments will be published.

Silver is not easily chloridized and volatilized and has so far offered greater difficulty than any of the common metals. It seems extremely sensitive to atmospheric conditions in the furnace and probably is easily affected by the gangue constituents of the ore.

Silver minerals occur in many low-grade and complex ores of lead, zinc, and copper, silver sometimes being of major importance, especially in economic value. A high percentage extraction is required to make any process for such ores commercially feasible.

In many ores the silver has minor value. When silver is present with rather high percentages of lead

and copper, it may not seem economical to provide the conditions for making high extractions.

Behavior of zinc in ores treated by the volatilization process depends largely on the arrangement of the mineral in the ore, also on the atmosphere that is maintained in the furnace during treatment. Experiments have indicated that in a strictly oxidizing atmosphere little zinc is volatilized, especially in the zinc carbonate ores of the Goodsprings, Nev., district. The test of the Yellow Pine Mining Co's. ores and of other ores from the Goodsprings district were made on zinc concentrate in which the zinc ranged from 30 to 40 per cent, the silver and lead content varying from 4 to 8 ounces and from 4 to 8 per cent, respectively. The quality of silver and lead volatilized ranged from about 50 to 90 per cent, whereas the total amount of zinc volatilized generally averaged less than 1 per cent.

Analysis of the fume precipitated in volatilization tests on these ores indicated high assays in silver and lead and 3 to 6 per cent in the zinc assay.

The behavior of zinc is very erratic, the conditions under which it is volatilized probably depending largely on the sulphur content in the ore. The presence of sulphur causes a complicated series of chemical reactions during the usual treatment, consequently a variable quantity of the zinc is driven off with other volatile materials. When crude ores high in sulphur content have been treated, most experiments indicated nearly complete volatilization of the zinc, but when the ore was given a preliminary roast to reduce the sulphur content, the amount of zinc volatilized varied considerably.

The presence of zinc in carbonate ores containing silver, lead, and zinc indicates that by volatilization a clean-cut separation can be made between the lead and zinc. On the other hand, in treating complex sulphide ores much of the zinc was volatilized in nearly every experiment and was subsequently precipitated in the Cottrell treaters as chloride with the other metal chlorides.

Details of these experiments on zinc are given in Bulletin 211, "The chloride volatilization process of ore treatment," which may be obtained from the Department of the Interior, Bureau of Mines, Washington, D.C.

### COMMERCIAL PRODUCTION OF RADIUM IN CORNWALL

The commercial production of radium in England began in February with the completion of an extraction plant at the South Terras Mine in Cornwall. The capacity of the plant is reported as 300 to 400 milligrams a month. In order to reduce the bulk or the ore and lessen the quantity of expensive chemicals necessary in the process a new concentration plant is also being added to the works.

Several Cornish mines have yielded radium-bearing ores for many years, but heretofore the output was shipped to Germany and France for treatment. The principal radioactive minerals found locally are pitchblende, autunite, and tobernite, the pitchblende deposits in Cornwall being said to be richer than those of Brazil, the United States, or Czechoslovakia. If the production of radium at the South Terras property prove successful, it is not unlikely that operations looking to a larger output of these ores will be undertaken at other mines in the region. — U. S. Commerce Reports.



## A NEW COMBINED MOISTURE TRAP AND SEPARATER OF UNIQUE CONSTRUCTION

A new device which separates and discharges water from Compressed Air lines; collects pipe scale, rust and sediment, delivers clean dry air, suitable for use in pneumatic tools and other equipment, has recently been placed on the market in Canada by the Canadian Ingersoll-Rand Company. This device known as "DriAir" was invented by C. A. Dawley of the New Jersey Air Meter Co. Mr. Dawley is a pneumatic engineer of note and also invented the well known Tool-om-eter, Drill-om-eter and the New Jersey Blower or Air Transformer.

Water in compressed air is a familiar nuisance, but its detrimental effects are not always fully recognized. The water itself slows down the operation of tools, freezes in the exhaust, washes out the lubricating oil, causing rapid wear and rusting of parts, cakes the sand and chokes the feed in sand blast machines, spoils air brush painting, and in fact is a disadvantage in most of the many applications of compressed air. In addition to these troubles, the wa-

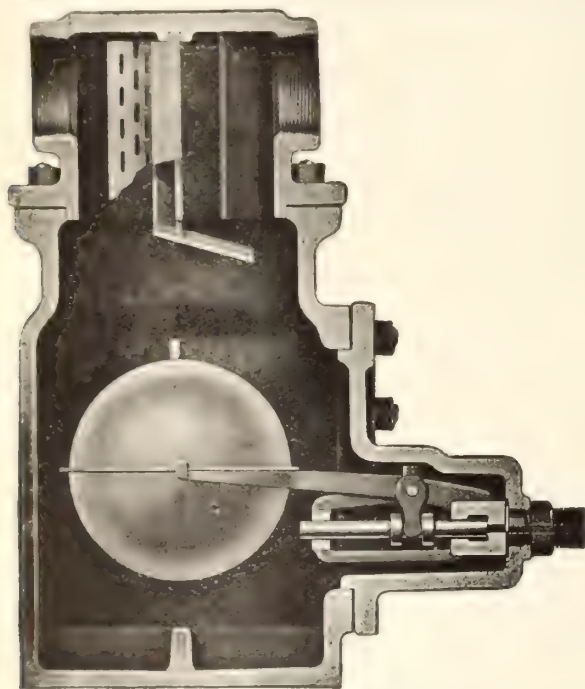


Fig. 1—Cross-section of the DriAir, showing vanes, float-valve, etc.

ter collects in pockets in the piping and, when finally picked up and carried along as "water hammer," loosens pipe scale, rust and dirt from the inside of the pipes and carries these gritty materials along into the equipment being operated.

### Why Water Collects in Air Lines

Ordinary free air, taken in at the inlet of a compressor, always contains moisture in the form of invisible vapor. The amount of water is expressed by the percentage of humidity of the air at any temperature. An actual example will illustrate how considerable a quantity of water is commonly involved. Take a compressor of 1000 feet per minute running for eight hours, intake temperature 82 F., humidity 75 per cent. The total weight of vapor taken in with the air will be 600 pounds, equal to about one and one-half barrels of water. If the air is compressed to 80 pounds pressure and not cooled by an after cooler, this entire quantity of water will go into the air lines. If an aftercooler is used and cools the air down to its original temperature, it should precipitate and collect 476 pounds of water but would still pass 124 pounds along

the lines in the form of vapor. This will be further condensed as the air cools off in the distributing lines and will show up at the outlets where the air is taken for use.

### The "DriAir" Removes and Discharges the Water

A DriAir at the outlets will separate and automatically discharge all the remaining water in liquid form. The DriAir should be installed on the branch lines as far as possible from the compressor, to give the air every chance to become cool. For this reason the DriAir is made in small sizes, even when used with large compressor plants.

The DriAir is automatic and requires no attention after installing. It drains itself by means of a float-operated valve as fast as the water collects. Separation is effected by the well known methods used in steam separators, including reduction of velocity, change of direction, baffles for collecting the entrained water and a channel or gutter to carry the water out of the influence of the current of air.

The makers claim no originality for the method of separation but only that it conforms to the best accepted practice in separator design. Tests show that the efficiency of separation is more than 99.5 per cent.

### Automatic Draining an Outstanding Feature

The great advantage of this new device is its automatic discharge action. This eliminates the necessity of a man going round at intervals to open drain valves, the supervision required to see that this is done and the annoyance and damage resulting if it is not done regularly. The DriAir combines in one device, a separator to collect the water and a trap to discharge it, both at about the price of either a good separator or a good trap alone. The DriAir, it is claimed, is not only simpler, cheaper and more compact than two units, a separator and a trap, but its action is much more satisfactory on account of entire freedom from becoming "air-bound," and other advantages shown below.

When used on steam or gas lines, the DriAir furnishes essential protection to reducing valves, regulators, meters, pumps and other equipment.

The DriAir is made in two standard sizes: for one-inch pipe, weight approximately 60 pounds; for two-inch pipe, weight 65 pounds.

### Self-Bailing Float

The DriAir is equipped with the highly ingenious self-bailing and non-collapsible copper float shown in the illustration. This float will stand any pressure, no matter

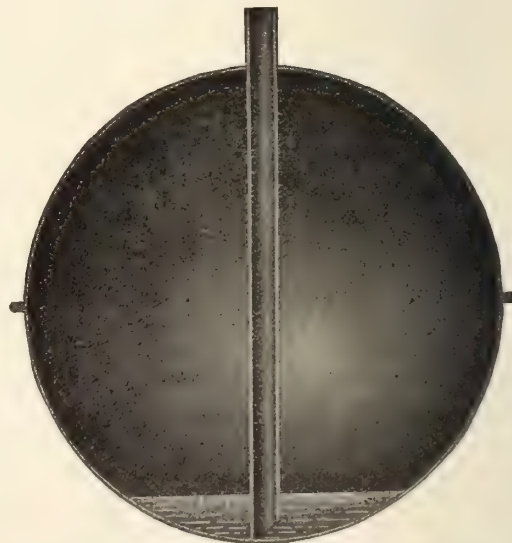


Fig. 2—Cross-section of self-bailing float



how high, for the simple reason that the central equalizing tube permits the outside pressure to enter the inside of the float. A slight reduction in the external pressure, such as occurs continually in any pressure system, will reverse the flow in the equalizing tube. Suppose a little water has accumulated in the float as shown, the outward flow through the equalizing tube will then eject the water first.

As the float does not have to sustain a high pressure, it is light and has great buoyancy. It is therefore powerful enough to operate a valve with large opening and high lift, giving a greater water discharge capacity than most steam traps of the same size inlet pipe. The mechanism is simple and sturdy and easily removable as a unit, without disturbing any pipe connections. All internal parts are of bronze or copper, free from corrosion and practically permanent. The valve seat is safeguarded from grit and dirt by its protected location, as will be seen by reference to the sectional cut of the complete device.

### ANTHRACITE COAL INDUSTRY OF WALES

The Welsh anthracite measures furnish almost the entire supply of this coal in the United Kingdom. All the anthracite fields in Wales lie in the mining district of Swansea (in western Glamorgan, Carmarthen, Becknock, and Pembroke Counties). An official survey of these measures made in 1904 for the Royal Commission on Coal Supplies reported the total amount of anthracite coal in sight as 6,310,292,214 long tons.

The South Wales anthracite measures have not been widely developed, owing to the limited demand, especially in the domestic market. Anthracite consumption in the United Kingdom does not exceed 2,000,000 tons per annum, and a large part of this is used in the marking of gas and in malting. The use of anthracite for domestic heating is very limited; nor does it appear that there will be in the near future any great expansion in this last use, as the British people seem (from long custom, perhaps) to prefer an open soft coal fire.

#### Production and Export Trade

The following table shows the output of anthracite coal in South Wales in the years 1912 to 1922, the amount of this output exported, and the percentage of exports based upon output:

Output and Export of Welsh Anthracite Coal

| Year           | Output<br>Tons | Export<br>Tons | P. C. of<br>export |
|----------------|----------------|----------------|--------------------|
| 1912 . . . . . | 4,353,010      | 2,355,718      | 54                 |
| 1913 . . . . . | 4,833,159      | 2,804,554      | 58                 |
| 1914 . . . . . | 4,370,239      | 2,256,270      | 51                 |
| 1915 . . . . . | 4,393,178      | 2,147,853      | 49                 |
| 1916 . . . . . | 4,318,201      | 1,929,405      | 45                 |
| 1917 . . . . . | 3,484,218      | 1,361,403      | 39                 |
| 1918 . . . . . | 3,518,735      | 1,125,857      | 32                 |
| 1919 . . . . . | 3,935,681      | 1,581,346      | 40                 |
| 1920 . . . . . | 4,231,951      | 1,627,693      | 38                 |
| 1921 . . . . . | 3,199,330      | 1,421,858      | 44                 |
| 1922 . . . . . | 4,168,257      | 2,037,476      | 49                 |

France is by far the most important market for Welsh anthracite, taking from 60 to 65 per cent of the total exports, and Italy is second, taking about 15 per cent. The remainder goes chiefly to Sweden, Spain, Netherlands, Norway, Denmark, Egypt, and Portugal,

in the order named. These markets and their relative importance in the Welsh anthracite coal trade have not varied greatly in the last 8 to 10 years.

With large measures of first-class anthracite coal at their disposal, and lying convenient for export at an average distance from port of not more than 25 miles, Welsh anthracite coal owners are seeking new markets for their product, both on the Continent, where Welsh anthracite already is widely used, and in other parts of the world. There is at present a plan under way for increasing the consumption of Welsh anthracite in Canada. Also, within recent months, considerable tonnage has been shipped to the United States.—U. S. Commerce Reports.

### SULPHUR AND PYRITES IN THE UNITED STATES, 1922

The output of sulphur in the United States in 1922, according to the Geological Survey, was 1,830,942 long tons, as compared with 1,879,150 long tons in 1921; but the shipments, which were 1,343,624 tons, greatly exceeded those in 1921, which amounted to 954,344 tons. The large stocks previously accumulated by producers were materially increased during 1922.

The total value of the sulphur shipped was greater in 1922 than in 1921, but the value per long ton was less. The value of the sulphur produced or shipped can not be estimated accurately because the only indexes of value available are the market quotations, which show only the selling price at certain times, and as the quantities sold at each price quoted are unknown, the weighted average price can not be calculated.

The imports were so small as to be negligible, but the exports amounted to about 487,969 long tons, compared with 285,762 tons in 1921, an increase of 202,207 tons, or about 71 per cent.

Nearly all the foreign producers of sulphur find themselves unable to compete with American sulphur in most foreign markets, and a great export market for American producers awaits only restoration of good foreign trade conditions.

In 1922, as in other years, Texas and Louisiana produced practically all the sulphur marketed.

The output of pyrites in the United States in 1922 amounted to 169,043 long tons, somewhat more than the output in 1921, which was 157,118 long tons, but the value was considerably less. The imports in 1922 were 269,947 tons, an increase of 53,718 tons over those in 1921, which were 216,229 tons.

Nearly all the pyrite marketed was produced in California and Virginia. The future of the domestic pyrite industry, except at a few places that are very favorably situated, is not promising. Domestic pyrite can not, under normal conditions, compete in markets on the Atlantic seaboard with domestic sulphur or with Spanish pyrite.

The increasing use of carbon black as a filler in the rubber industry has expanded its market considerably in recent years. This should prove of interest to the producers of natural gas in the Canadian west, who can make it cheaply.

The world's oil production for 1922 is estimated at 848 million barrels, or 120 million tons. This is 80 million barrels above all previous records.



# THE MINING DISTRICTS

BY THE JOURNAL'S CORRESPONDENTS.

## NORTHERN ONTARIO

**Cobalt.** — At the new shaft of the Colonial property, a vein was interrupted a few feet from the station in which silver has been found. While the grade is not high, it is encouraging to find silver so close to the shaft, particularly as the vein encountered does not appear to be the main one, to intercept which the shaft was sunk.

On the Violet property, adjoining the Colonial, cross-cutting has been started at 150 feet to cut the old levels in which high-grade ore is known to exist. The last work done on the 600-foot level of the old workings disclosed a new ore-shoot that produced 45,000 ounces in 45 feet of drifting. It is expected that regular production from this property will be commenced before the end of the month.

At the Beaver property, which is under option to the Coniagas, several high-grade shoots have recently been encountered, which add materially to the value of the property. The ore is being broken down into stopes and at present no attempt is being made to sort it. It is expected that the mill will be started in June.

**South Lorrain.** — The Mining Corporation is preparing to sink two new shafts on its South Lorrain property and is installing a larger plant. Development in the district has been very badly hampered by the condition of the road, which is in extremely poor shape. The government undertook to put the road in shape last year, but spent most of the time on the part that least needed it. The Northern Development Branch has promised, however, that action will be taken and that the road will be improved. At the present time it is practically impassable.

The Keeley announces that no dividend is to be paid immediately, as the company desires to conform to the English custom of paying dividends semi-annually. The company proposes to increase the mill capacity from 60 to 125 tons a day and is also making extensive improvements at the mine. Sinking to the 550-foot level is to be started immediately in order to open up the Woods vein and No. 26 vein at that depth. The Keeley is now one of the most important silver producers in the continent and could greatly increase production if it desired to do so.

Mr. Hamilton B. Wills, president of the Keeley, and associates, have purchased the Maidens Silver Mine in the vicinity of the Keeley. The property has produced some ore and is understood to have a certain amount of milling ore developed.

**Porcupine.** — Mr. J. B. Holden, a director of the Hollinger, has issued a statement on behalf of the company in which he says there is absolutely no truth in the report that the control of the mine is passing into the hand of English and South African interests. He also states that no person connected with the Hollinger is either endeavoring to, or desirous of, dising done by the promoters behind the Matachewan posing of control.

The Coniagas is installing a large electrically driven plant at the Newray, in order to permit of development being carried to 1000 feet. A steel head-frame will be erected over the new shaft, which is to be located west of the old workings. Practically no information has been given out by the Coniagas as to the result of developments to date, but the preparations being made indicate that the company is ready to make a large expenditure in order to test thoroughly the possibilities of the property.

At the Vipond the work of putting the mill in shape for operation has been commenced, and it is expected that within a few months milling at the rate of 75 tons a day will be under way. Further development on the new vein on the 400-foot level continues to show satisfactory results.

The Davidson is making preparations to sink a 1000-foot inclined shaft and has purchased a new hoist for it. A site is being cleared for a 500-ton mill, and construction is expected to commence this summer.

At the meeting of the Porcupine Miners' Union, which was held last Sunday and at which it was thought a strike vote might possibly be taken, it was decided to try to confer with the mine managers regarding the Union's request. The meeting was poorly attended, and while there is still a possibility of trouble, it is not expected that it will develop.

**Kirkland.** — Directors of the Lake Shore have declared the regular quarterly dividend of 2%, payable May 15th to shareholders of record May 1st.

Kirkland Lake Proprietary, which is now adequately financed, has acquired controlling interest in the Bush Mine in British Columbia, as well as an interest in the Porcupine field. Developments at the company's property in Kirkland are understood to be encouraging.

Mr. A. D. Miles, representing the English house of John Taylor & Sons, has acquired an option on the Kirkland Townsite property, consisting of 85 acres lying to the south of the Wright-Hargreaves. A new English company will be formed with a £300,000 capitalization, of which the Townsite shareholders get one-third. The sum of £20,000 is to be raised for the purpose of development and for a small payment for the option. It is understood that a shaft will be sunk to a considerable depth with the hope of picking up the extension of the Lake Shore No. 1 vein. The Townsite is one of the last close-in properties to be developed and from its location is favorably thought of.

A public offering of shares is being made by the Kirkland Hudson Bay Company, in which the Hudson Bay Mines of Cobalt has a large interest. The capitalization of the Kirkland Hudson Bay is 2,000,000 shares of \$1.00 par of which 1,523,000 shares have been issued. A shaft is to be sunk immediately to explore the property at depth.

**Matachewan.** — Some very clever advertising is being done by the promoters behind the Matachewan



Canadian Gold Mines Limited, who are offering 600,000 shares of stock at \$1.00 per share, which is the par value. As usual in this class of advertising, hope is held out that the property will be another Hollinger and that an investment of a few thousand shares will bring relief from all financial worries for the future. The property may possess a good deal of merit; but the methods of the promoters are not such as to commend it, and the advertising would carry a good deal more weight if it were supported by the report of an engineer who has no financial interest in the promotion.

**Larder.** — Following the recent annual meeting of the Canadian Associated Goldfields, one of the shareholders who was heavily interested in the earlier company, stated to a Toronto newspaper that he proposed to ask the Crown Attorney to investigate the affairs of the company, particularly as to the original promotion, the deals between the promoters and the company, and the means whereby the hands of the early shareholders have been tied. Prior to the acquisition of the new claim, adjoining the Crown Reserve property, there was a good deal of talk regarding the advisability of an investigation of the affairs of this company by Provincial authorities. Through various reorganizations and the taking in of other properties, the capitalization was raised to \$30,000,000, and stock was sold in this company at quite a high price, based on glowing promises about the profits to be derived from the 10,000-ton mill the company proposed to build, and for which, of course, there was just about as much justification as there was for a capital of \$30,000,000. It is understood that the most promising discovery on the company's properties is on the claim adjoining the Crown Reserve, where a continuation of the Crown Reserve vein has been found and developed.

## NOVA SCOTIA

**Coal on Way to Montreal.** — The opening up of the St. Lawrence, is awaited anxiously by the mine workers of Nova Scotia, just as is the summer sun by the farmer. This year the season is late, and great fields of ice stretching far beyond the vision of the eye lie on the Cape Breton coasts. Through these ice fields large ships find it very difficult to pass. The heavy Arctic ice and the Gulf ice met this year, forming an almost impassable barrier. The colliers bound for Montreal were forced to change their route and pass down through the Straits of Canso. This is something new in the history of Nova Scotia coal transportation; but that the vessels are now on the way to Montreal is the one thing that pleases us.

**Good Production of Coal in Cape Breton.** — The coal output of the Dominion Collieries in Cape Breton for the first four months of the year was 1,466,246 tons, against 833,576 tons for the same period last year. At this rate of increase (and it should be larger during the summer months), the output for the year should exceed that of last year by almost two million tons. Of the amount mined so far, 410,000 tons is still in stock piles. The bulk of the remainder was sold in the New England market. This is the natural market for Nova Scotia coal. It is much closer to the Cape Breton collieries than the Quebec market. There is no closed navigation season, as the ports are always open, and

if it was a market on which Nova Scotia could always rely, it would greatly lessen the amount of coal to be stocked in winter and save the tying up of capital, to cover the wages paid out during two or three months when coal cannot be shipped to Canadian consumers. Other districts of the province show increased outputs, and the coal industry bids fair to close up a large part of the gap between the 1913 and 1922 outputs.

**Wise Workmen.** — The works of the Nova Scotia Iron and Steel Co. at Trenton are having a busy season, and have orders ahead to keep the plant running steadily for some months to come. Realizing the necessity of doing their part in fostering and helping the industry, the steel workers of Trenton have formed shop committees to transact their business and discuss grievances with the Company. Men who take this attitude are prudent, and will no doubt be repaid by steady employment, for the stabilizing of business is the one prime requisite at the present time.

Cape Breton has had its thrills lately in labor circles, and after the great display of Turkey red cotton in Glace Bay streets on May the first, the stocks of W. U. Cotton slumped badly in the market, and he found himself railroaded out of the district and on his way back home. He had given his confederates "some service", and they know it, but that did not save him from the evil day. Although a bold attempt was made to saddle him on the U.M.W. organization, the Locals would have none of it. The day of revolution he so fervently preached in the "Labor Herald" became for him a day of retribution, exacting the penalties of a fickle public who clamored for another editor.

**The Brave Man Runs.** — A Red Editor, Malcolm Bruce of the Workers Party, Toronto, came to Glace Bay, defied the "Red Flag", and publicly prayed for the day to come when its folds would o'erspread the whole earth. He is said to have insulted the Union Jack. Whether this is true or not we cannot say; but the Attorney General of Nova Scotia expressed the desire to meet this latest "Red Missionary", and sent for him to come to Halifax. Bruce, however, unlike a great Scottish namesake, did not relish the honor of falling in freedom's cause, and fled, and though diligent search was made for him, he could not be found. There is no price set on his head, for he isn't worth it; but he has learned that it is not yet quite safe to pray for "Red Flags" in public meetings at Glace Bay. The good citizens of Cape Breton are, to use a slang term, "fed-up" with this Red stuff, and are giving evidence that their patience has reached the limit, and they are going to have no more of it. Even in one of the Locals of the U.M.W. a riot was almost precipitated when one of the Red members began preaching his doctrines too loudly.

The uses of chromium as an alloying element, particularly in steel, are becoming more numerous and more important with remarkable rapidity. The prospective value of deposits of chromium ore is thus enhanced, and it is well worth the attention of prospectors.

The "Mining Journal", London gives warning of a pending scarcity of manganese ore.



## BRITISH COLUMBIA

**Limestone Quarry on Texada Island.** — An extensive belt of limestone, found in the northern part of Texada Island, is being exploited on a large scale by the Pacific Lime Co., which owns approximately 1,000 acres. Their plant is situated at Blubber Bay and the chief quarries are in that section. A contract has been entered into for the shipment of 25,000 tons to the Granby Consolidated Mining and Smelting Co. at Anyox within the next twelve months. A new crushing plant is being installed for the purpose of preparing the material in accordance with contract terms. The company also deals in burnt lime and hydrated limestone, operates its own saw-mill and barrel and stave factory and employs some 150 men.

**Portland Canal.** — Pronounced activity is reported from the Portland Canal District. Camp and mine supplies are being shipped to the Virginia and Taurus Groups, on the Alaskan side of Salmon River, by the Virginia Alaska Co., and Mr. Andrew G. Larsen the managing engineer, has arrived at Stewart to take charge of development operations. Much the same kind of preparation is being made in connection with the property of the Premier Extension Gold Mining Co., of which Malcolm McKenzie, formerly in the employ of the Premier Mining Co., will have supervision. An oil tank of 15,000 gallons capacity, a new compressor, and a large quantity of general supplies, have been delivered at the Indian Mine over the snow.

B. W. W. McDougall has taken hold of the Daly Alaska Mine and new machinery is being shipped to the property. Ridgeway R. Wilson, managing engineer of properties controlled by the Trites, Wilson and Wood interests, has reached the North. Prospects whose development Mr. Wilson will supervise include the Big Missouri, Unicorn and International Groups on the British Columbia side of the boundary and the Stoner Group in Alaska.

**Granby's New Mine.** — H. S. Munro, general manager of the Granby Consolidated Mining & Smelting Co., who recently visited the Outsider Group, Maple Bay, Portland Canal, is quoted as stating that a substantial tonnage of copper bearing ore is likely to be shipped from this point during the summer. Ore bunkers, a wharf, a tramline, and additional camp facilities are among the projected improvements. On the Sunshine Group, also under bond to the Granby Co., a considerable amount of stripping will be done before further underground development is proceeded with.

**Alice Arm.** — The Homestake, Kitsault Glacier, Alice Arm District, is to be opened up further this season. The Homestake Mining Co. proposes driving at least 300 feet of tunnel. The ore-body encountered on No. 1 tunnel will be cross-cut and No. 2 Tunnel will be continued. The Bellevue, on the Illiance River, also is to be developed by the Alice Arm Holding Co. while the War Dance Group on the northeast fork of the Kitsault River, the Horseshoe Group, McGrath Mountain, and the Cariboo Group, Lime Bay, are other properties that will have attention.

**Smithers.** — Since the Henderson Mine, Hudson Mountain, near Smithers, has been opened up and highly satisfactory returns received from the several carloads of ore shipped to the Trail Smelter, there are marked signs of mining activity in this district. A first-class wagon road is to be constructed from Smithers up the mountain to tap the Henderson and the various prospects in that locality. The Provincial Mines De-

partment is undertaking the construction of the trunk road and the mine owners will build branches to their properties. J. F. Duthie, who manages as well as holds a large interest in the Henderson, is making large expenditures on mine plant, which is being shipped and installed at the present time.

The Federal Mining & Smelting Co. are going ahead with the development of their Dome Mountain property in this section. A compressor, drills, boiler, and other equipment is being taken in and the management expects to be in a position shortly to recommend the installation of a concentrator.

**Mineral Exhibit in Spokane.** — The minerals of the Kootenay and Boundary Districts of British Columbia are to be displayed at the forthcoming Annual Convention of the Northwest Mining Assn. at Spokane. The Prospectors' Association of the Interior has been engaged in collecting this exhibit and it is stated that their efforts have been so successful that the Province will be worthily represented. F. A. Starkey of Nelson is in charge of this work and expects, when the time comes, to lead a large body of Canadian mining men to the Spokane conference.

**No Testing Plant this year.** — Mining men of the Kootenays are disappointed because of the announcement that no provision is being made by the Dominion Government for the establishment of an ore-testing-plant in British Columbia. The estimates for the new year, it is stated, will not carry the \$100,000 appropriation required for the installation. Instead there will be a vote of \$5,000 that can be drawn upon by the mine operators of the west for the payment of freight charges on shipments of ore to the testing plant at Ottawa.

**Greenwood Mine Sold.** — The Providence Mine, Greenwood, was auctioned by the sheriff several weeks ago and passed to William Madden, former manager of the mine, for \$2,000, which means that the creditors will receive about 7 cents on the dollar. The property is subject to a bond issue of some \$50,000. It is stated that operations will be resumed in the course of a few months.

**Trail Ore Receipts.** — Ore receipts at the Trail Smelter, Consolidated Mining & Smelting Co. of Canada from April 15 to 21st inclusive totalled 7,428 tons. The shipments in detail follow:

| Mine .. . . .                          | Tons  |
|----------------------------------------|-------|
| Black Rock, Northport, .. . . .        | 107   |
| Company Mines .. . . .                 | 6,548 |
| Knob Hill, Republic, Wn. .. . . .      | 158   |
| Lone Pine, Republic, Wn. .. . . .      | 166   |
| Paradise, Invermere .. . . .           | 92    |
| Rosebery-Surprise, New Denver .. . . . | 54    |
| Silversmith, Sandon .. . . .           | 190   |
| Standard, Silverton .. . . .           | 113   |
| Total .. . . .                         | 7,428 |

**Belmont-Surf Inlet Report.** — The annual report of the Belmont Surf Inlet Mines Ltd., operating on Princess Royal Island, just issued, shows a 100 per cent increase in profits during the year just closed over those of the preceding twelve months. The value of the ore milled increased from \$6.89 to \$8.76 per ton, which explains the generally improved position of the company. 105,971 tons of ore was mined and milled as compared with 134,570 tons in 1921 and the operating



profits were \$112,702.95. A dividend of 2½ per cent was paid, absorbing \$62,500, and \$57,655.03 written off for depreciation. The average metal content of the ore was 0.375 ounces gold and 0.189 ounces silver per ton, and 0.329 per cent copper. The production was 35,014 ounces gold, 17,105 ounces silver, and 697,058 lbs. copper. The ratio of concentration was 11.02 into 1, and recovery of values 89.36 per cent, leaving the loss in milling at 10.64 per cent. Mining costs were \$3.695 per ton and milling 9.2 cents. Flotation royalties were reduced from 8½ cents per ton to less than a cent per ton. Owing to greater underground expense and the more refractory character of the ore, total costs increased 52 cents per ton. Ore reserves are placed at 32,200 tons actual and 68,025 tons possible ore, a reduction of 37,553 tons on the estimates of the previous year. There are good possibilities of a large increase in the ore reserves. The values realized from ore shipments amounted to \$663,265.12. The expenses of mining and milling were \$552,408.

**Yukon Silver Ore.** — It is estimated that some nine thousand tons of high-grade silver ore will be shipped from the Mayo Camp, Yukon Territory, as soon as navigation opens in the waterways of the Yukon and Alaska. Four large steamers and fourteen of the barges available are being prepared for the service. In May, June and July these will be engaged in carrying the ore down the Yukon River to the American Government's new Alaskan Railway, which will take it from Nenana on the Tanana River to the coast terminal at Seward and Anchorage, Alaska, where it will be transferred to ocean vessels on the last "leg" of its journey to the smelters. It is stated that this down-stream haul on Yukon waters has so reduced transportation charges that it will be possible to handle ore of a lower grade than heretofore.

**Proposed Iron and Steel Plant.** — H. J. Landahl, of the Coast Range Steel Co., recently addressed a meeting of business men of Vancouver, urging co-operation and

support in the endeavor he and his associates are making for the establishment in British Columbia of an iron and steel industry. He recited what had been done in England and Eastern Canada in the way of organization, declared that Canadian and foreign concerns now serving the market were hostile, and said that the West should pull as a unit for the enterprise if the early development of its immense resources was desired. Mr. Landahl's project was warmly endorsed and a committee of five was appointed to keep in touch with the company and to tender all possible assistance.

**C. I. M. & M.** — The B. C. Division of the Canadian Institute of Mining & Metallurgy will meet on May 14th in Vancouver to tender a farewell dinner to Mr. Guernsey, the retiring chairman.

**British Empire Exhibition.** — It is assured that British Columbia will be represented at the British Empire Exhibition, to be held next year in London, by a mineral exhibition that will worthily illustrate the resources of the Province, stated the Hon. Wm. Sloan recently. W. D. Dalglish, chief of the Minerals Division, Canadian Government Exhibition Commission, is in Vancouver and called on Mr. Sloan to discuss the business of collecting an exhibit from this province for shipment to the Old Country as a part of the Canadian display.

The work of assembling such an exhibition has been in progress here for months under the supervision of Wm. Fleet Robertson, Provincial Mineralogist. Specimens have been obtained from most of the producing mines of the Province. Many are yet to be secured from the different districts. The work of selection from each of the mineral-bearing sections, having in mind the long productive Kootenays, the riches of the Boundary, the wealth of the historic Cariboo, the phenomenal showings of the Northwest and Northeast, as well as the substantial but comparatively little developed resources of the lower Coast and Vancouver Island, will be continued until there has been gathered a display that will be thoroughly representative.

Mr. Dalglish was promised the complete co-operation of the Provincial Department of Mines in this task. He will spend several days here in conference with local officials. In his opinion the Canadian mineral exhibition will excel that shown at the Panama Pacific Exposition in 1915; in fact it will be the finest that has left this country and in large measure its merit will be due to British Columbia's contribution.

Mr. Sloan states that Canada's building will be on a scale, in point of size, never before undertaken by the Dominion in connection with exhibitions. There has been included already in the main estimates \$500,000, which will be swelled by \$250,000 in the supplementary estimates. Thus there will be three quarters of a million dollars available for the preliminary work in building and otherwise preparing for Canada's representation at the Empire Exposition. Canada's keenest competitor among the Dominions will be Australia but from the plans under consideration the Canadian mineral feature should outstrip all others.

Systematic exploration has disclosed in the Panhandle region of northwestern Texas beds of potash salts that promise to be commercial, both as to grade and as to quantity. It occurs as layers rich in potash salts within thick beds of common salt, lying at depths up to 2000 feet.



#### PURCHASE OF GOLD ORES

The attention of prospectors and others is drawn to the provision in the Mining Act of Ontario authorizing the Department of Mines to purchase parcels of gold ore taken out by prospectors and others in developing or working mining claims. Arrangements have been made by which such parcels of gold ore, whether large or small, will be accepted by the Temiskaming Testing Laboratories at Cobalt, and paid for according to the schedule provided for the purpose. The Laboratories are operated under the auspices of the Department of Mines.

This offers a first class opportunity for testing the value of ores on a large scale, and also of turning ore of good quality into money for carrying on further development work. By special arrangements, on less than carload lots, freight rates on the T. & N. O. Railway are reduced 50 per cent.

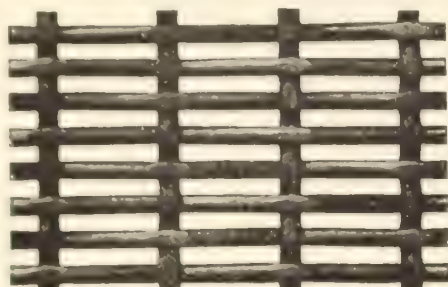
The Laboratories are also equipped for working out the best methods of treatment for gold or silver ores of a refractory or unusual character.

Full information as to treatment charges, schedule of payments, etc., can be obtained from the undersigned, or from A. A. Cole, Manager, Temiskaming Testing Laboratories, Cobalt, Ontario.

THOS. W. GIBSON,  
Deputy Minister of Mines.

Toronto, 12th March, 1923.





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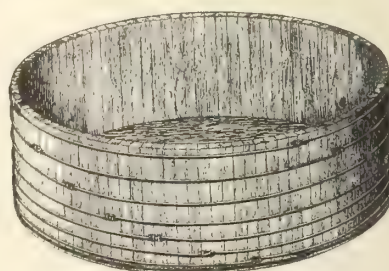
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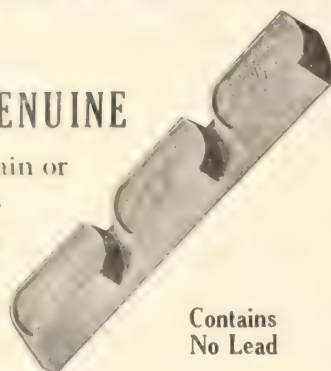
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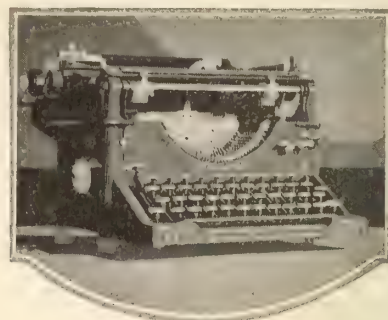
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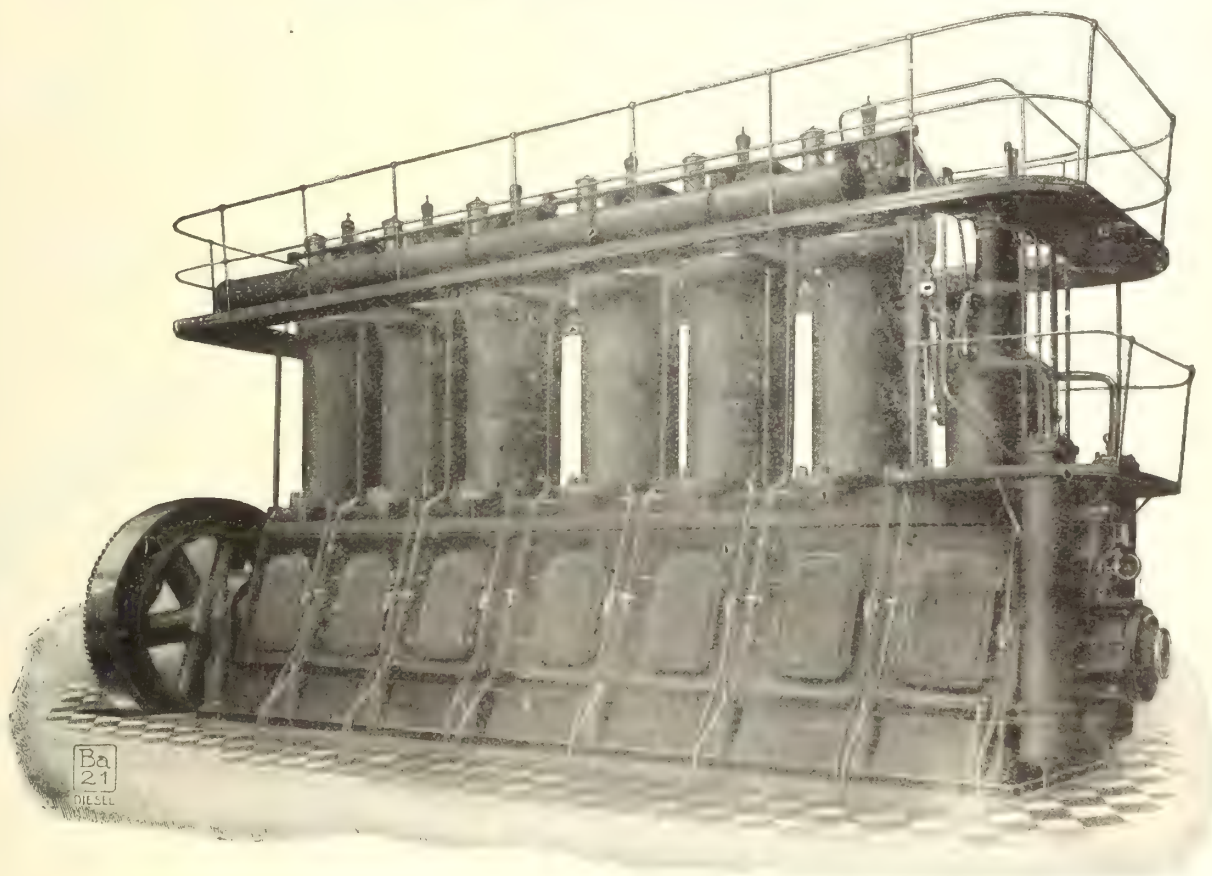
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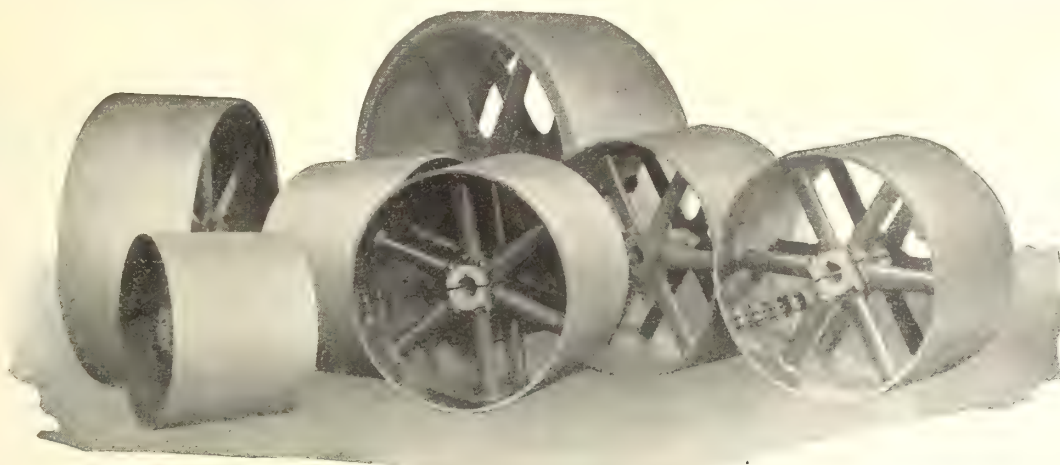
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The illustration above is of a group of Cast Iron Cone Pulleys made by us for a large Paper Mill in Quebec. This job is one of many fine examples of work done in our Foundry and Engineering Shops.

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The vast number of patterns, accumulated over a period of years, enables us quickly to manufacture Single Belt, Double Belt or Triple Belt Cast Iron Pulleys.

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ways, and with two setscrews over the keyways. This is standard practice, and no extra charge is made. Keys are never furnished with Pulleys unless specifically ordered.

When ordering Pulleys, please specify exactly.

- (1) Single or Double Belt Pulleys,
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- (3) Crown or Straight Face,
- (4) Setscrews only, or Keyseated and Setscrews,
- (5) Any special conditions of service.

We can give prompt and reliable service on immediate orders.

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# Ontario's



# Minerals

PROVINCE OF ONTARIO

DEPARTMENT OF MINES

HON. H. MILLS, Minister of Mines

## Mineral Areas.

Ontario, with its 407,262 square miles, contains many millions of acres in which the geological formations are favorable for the occurrence of minerals, 70 per cent of the area being underlain by rocks of pre-Cambrian age. The phenomenally rich silver mines of Cobalt occur in these rocks; so also do the far-famed nickel-copper deposits of Sudbury, the gold of Porcupine and Kirkland Lake, and the iron ore of Magpie and Moose Mountain mines.

## Economic Minerals.

In addition to the above, practically all economic minerals (coal and tin excepted) are found in Ontario:—actinolite, apatite, arsenic, asbestos, cobalt, corundum, feldspar, fluor-spar, graphite, gypsum, iron pyrites, lead, mica, molybdenite, natural gas, palladium, petroleum, platinum, quartz, salt, talc and zinc. This Province has the largest deposits on the continent of talc, feldspar, mica and graphite.

Building materials, such as ornamental marble, limestone, sandstone, granite, trap, sand and gravel, lime, Portland cement, brick and tile, meet every demand.

## Mineral Production.

Preliminary returns show the output of the mines and metallurgical works of the Province for the year 1921 to be worth \$48,128,387, of which the metallic production was \$27,574,202.

The following figures show the rapid growth of Ontario's mineral industry by five-year periods since 1891:

| Year.      | Value.      | Year.      | Value.       |
|------------|-------------|------------|--------------|
| 1891 ..... | \$4,705,672 | 1906 ..... | \$22,388,383 |
| 1896 ..... | 5,235,003   | 1911 ..... | 41,976,797   |
| 1901 ..... | 11,831,086  | 1916 ..... | 65,303,822   |

## Dividends.

Dividends and bonuses paid to the end of 1921 amounted to \$23,140,734 for gold mining companies, and \$84,388,185 for silver mining companies or a total of \$107,528,919.

## Mining Regulations.

A miner's license costs \$5.00 per annum, and entitles the holder to stake out in any or every mining division three claims of 40 acres each. After performing 200 days' assessment work on a claim, patent may be obtained from the Crown on payment of \$2.50 or \$3.00 per acre, depending on location in unsurveyed or surveyed territory.

## Assay Office.

The Provincial Assay Office at No. 5 Queen's Park, Toronto, is maintained by the Department of Mines for the free identification of minerals, free assays under the provisions of the Mining Act of Ontario, and also for general assay work as per the Schedule of Charges which may be obtained on application.

## Temiskaming Testing Laboratories

The Department maintains, at Cobalt, an ore sampling and testing laboratory which is now prepared to receive parcels of gold ore from 100 pounds upward; and after sampling and assaying the same to pay to the shipper the value thereof, less treatment charges. The purpose is to afford a market for ores extracted by prospectors and others in developing their mining claims, enabling them to obtain funds which they can use for further work and to report on the most satisfactory method of treatment. Fuller information may be obtained on application to the Manager, Temiskaming Testing Laboratories, Cobalt, Ontario.

## Publications.

For list of publications, illustrated reports, geological maps and mining laws, apply to

THOS. W. GIBSON,  
Deputy Minister of Mines,  
TORONTO, CANADA.



# Tenacious!

## POWER TRANSMISSION BELTING

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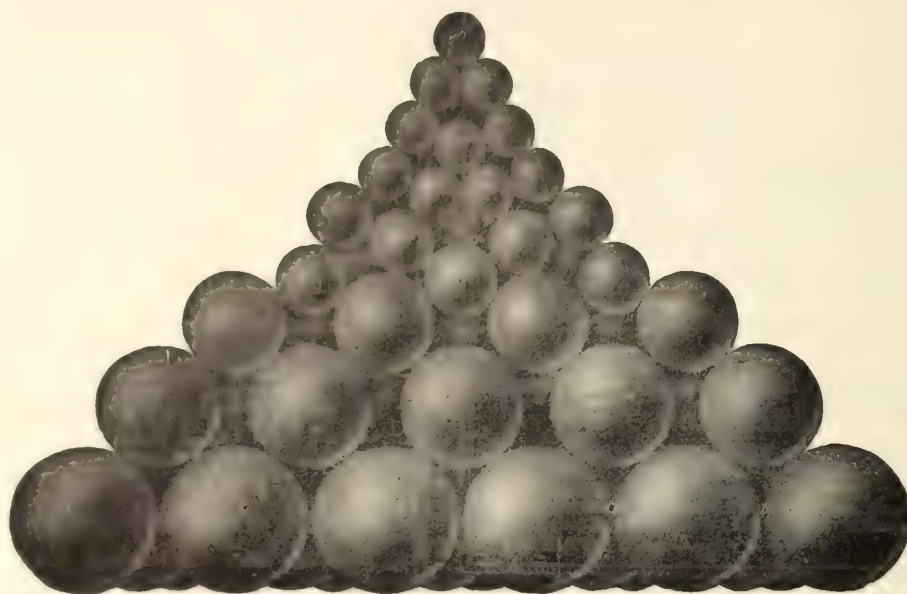
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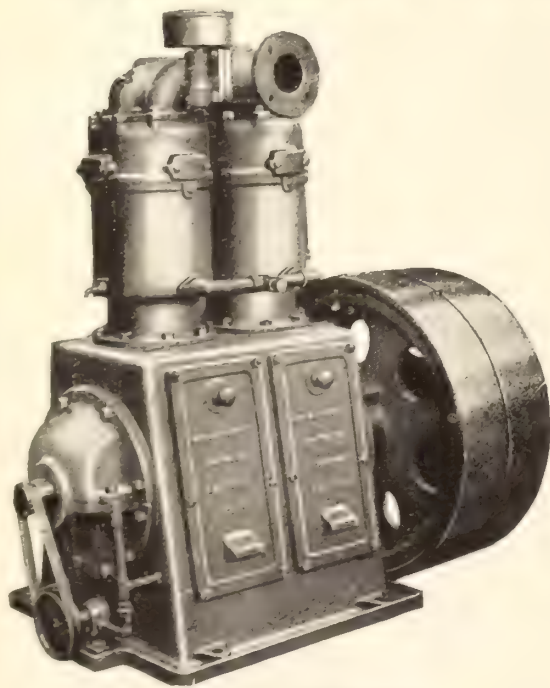
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## : - : EDITORIAL : - :

### EFFECTIVE PUBLICITY NEEDED

The reputed finds of placer gold in Labrador have attracted official attention. We reproduce today on another page the pronouncement of the Geological Survey, Ottawa. It is a straightforward recital of the known facts and logical deductions, with the inevitable conclusion that the "finds" are most likely a fraud.

The publication of this report by the Geological Survey might be considered timely if it were not four months too late. Most of the damage has been done. The public's money has been gathered in, the good name of various reputable men of science and explorers has been misused by the culprits, and Labrador, a genuine land of promise for the prospector, has been made a laughing-stock on two continents. This might have been prevented. All the information quoted in the Survey's report was available in January, when the *Canadian Mining Journal* came to exactly the same conclusion from the same data as the Survey has reached now, four months later.

One cannot doubt the intention of the Geological Survey to serve the mining industry and the public by every means at its command. It has an enviable reputation for sound judgment and conservative conclusions which is a valuable asset to itself and to the country and must not be impaired. Nevertheless we are of the opinion that this Labrador incident illustrates a grave defect in the organization, not only of the Geological Survey but of its other half, the Mines Branch. We alluded to this defect a few weeks ago. The Department of Mines in Ottawa has no officer whose duty it is actively and consistently to make and retain an effective contact with the public. The Department needs a publicity officer.

As it is at present constituted, the Geological Survey can be expected to deal with a public scandal like this Labrador affair only when its attention has been drawn forcibly to it by the march of events, and some action forced upon it. Even then, it falls to the lot of some official fully occupied in another line of work to deal with the case. In this instance, Labrador Gold-fields, Limited, was actually made the subject of questions in the House of Commons on May 14th by Mr. Gauvreau, the questions being answered by Hon. Mr. Copp. Fortunately, the Survey's report antedated these questions by a few, though very few, days.

The branches of the Department of Mines can do a very valuable work of leadership, in addition to what

they are already doing, if they are allowed the opportunity. At the present juncture, when capital in large amounts is available for mineral development and when a host of get-rich-quick gentry infest our land in the hope of diverting part of this money into their own pockets, it is surely worth while to provide for this special need. The proper man acting as liaison officer between the technical staffs of the Department of Mines and the public will certainly save many times his salary, and might conceivably save millions of dollars annually.

### NEW LIGHT ON AN OLD GOLD DISTRICT

It appears at present as if the Lake of the Woods gold region of northwestern Ontario had re-commenced a useful existence. For quarter of a century it has remained for the most part dormant, having been effectually put to sleep by an over-dose of opiate in the form of stock-jobbing and mismanagement. Authentic records of "showings" uncovered at that time demonstrate the existence of prospects, still in the main undeveloped, such as would stimulate a "rush" of both prospectors and capital were they discovered anew today.

In spite of the prevalence of mismanagement, one property, the Sultana, was worked consistently and made money for its owner, and the reason for its closing down in the midst of a useful career has remained somewhat of a mystery. The vein outcropped near the shore of a peninsula and an outsider staked the water rights. The opinion current among the "old timers" in Kenora is that the vein dipped under the lake, off the Sultana property, and that rather than deal with the holder of the water rights, the owner preferred to close down his mine.

For several months the Mikado mine has been under examination and active development by Colonel H. A. C. Machin, and it is reported that the result of this work has been distinctly encouraging. It is a bold stroke to undertake thus the rehabilitation of an abandoned and discredited mine, made malodorous by former financial manipulations, and Colonel Machin's efforts deserve a full measure of success. If the result of his work continues to be as satisfactory as it has been to date, we may expect to see operations at the Mikado firmly established from now on. In this case there will be a general revival of interest in the district.



The geological mapping of the Lake of the Woods district was done in what has been called shrewdly "the phrenatic era" of geology; rocks were classified according to the colour their outcrops presented, and it was quite unnecessary for the geologist to leave his canoe. Nevertheless the old maps are useful in delimiting the areas of granite and of the older basic rocks, and the prospector of today need not waste time on useless exploration in areas of the former.

Some casual observations on Lake of the Woods a year ago by one familiar with the rocks of the Porcupine and Kirkland districts disclosed some interesting features, not yet officially recorded. This observer found distinct evidences of acidic intrusions, presumably of Algonian age, among the older granitic rocks. He also observed on one of the islands where a new showing of gold had been uncovered an intrusion of porphyry and the rusty weathering carbonate rock typical of the established gold areas. A new study of the area in the light of present-day geological knowledge might well show this area to be the geological counterpart of that six hundred miles to the east, on the other side of the province.

Last autumn a spectacular find of gold was made within the town limits of Kenora, in an excavation being made for a cellar. Subsequent examination showed it to be only an isolated pocket; but what there was of it was amazingly rich. This find caused hardly a ripple of excitement among the residents of Kenora. They have become so "fed up" with disappointment and are so accustomed to hope deferred that what would have set fire to the imagination of the ordinary community and caused a wide-spread search hardly caused them a thought. Still, a handful of the "old-timers" continue to prospect in a desultory way, in spite of the present difficulty of obtaining capital for use there.

The present indications are that within the next few years there will be a general revival of interest in the old gold camps of northwestern Ontario and that then, for the first time, they will have the thorough examination and honest development they deserve.

### THE HUNDRED MILES OF GOLD BELT

Last month Dr. H. C. Cooke, of the Geological Survey, did the prospectors of Ontario and Quebec a notable service by providing for their use, through the pages of the *Canadian Mining Journal*, his description of the new Quebec gold field, including practical and explicit directions for effective exploration and prospecting. He has now extended this service by preparing an article on the eastward extension of this field, which we publish in this issue.

The prospective gold belt of northwestern Quebec is over one hundred miles in length. Only a small part of it, at the western end, has as yet received any

significant amount of attention from prospectors, and to that section will be attracted the larger part of those interested in the field. The possibilities of the eastern part have been merely indicated by the slight amount of work done there up to the present; in fact the only available geological map of that part is, to a large extent, blank, due to no examination having been made away from the principal water courses.

The wise prospector, if he has not already obtained a holding in or about the "rush" area, will keep as far away from the crowd as he can. There is plenty of room. In our issue of May 11th, our Quebec correspondent described effectively the various travel routes available for reaching the gold belt. From Nottaway, Amos and Villemontel on the Canadian National Railways water routes extend southward into the promising areas. From Amos access to the eastern end of the belt is particularly easy, travel by motor boat being practicable for most of the distance. Lake de Montigny, on this route, has been already the scene of prospecting for gold, and a recent newspaper description of the forthcoming visit of a British peer, interested in a property there as well as in the "adjoining" Hattie and Hollinger mines, has cast a new light on Canadian geography and methods of exploration.

Dr. Cooke's article is admirably explicit in its findings and suggestions, and will well repay careful study by those interested in the further and extended exploration of the new gold field.

### EMPIRE DAY

There is much talk these days about the independence of various parts of the British Empire. The creation of the Irish Free State, the granting of a measure of self-rule to the three hundred millions in India, the sovereign independence of Egypt (which the Egyptians are already commencing to regret), and the now famous (or notorious) fish treaty between the United States and Canada mark the tide that ebbs and flows in the sea of political administration, always with a final tendency toward local autonomy and responsible government. Amidst all this talk about independence, one hears seldom of inter-dependence; yet mutual dependence is the solid rock upon which the British Empire is founded. Sentiment, and even at times sentimentality, may play their part in forging the bonds that make the Empire a unit; but self-interest and a common benefit are the principal and the most lasting means of ensuring that our heterogeneous and polyglot Empire shall endure.

Empire Day will always be for those of the older generation the day of the great Queen. In her honour we burned our fingers, frightened the horses, startled our young sisters with strange concoctions of gunpowder and coloured fire, and depleted first our own pockets and then those of our male parents, if they also were infected with the enthusiasm of the



day. However, the current inspiration for thought as well as for enthusiasm is now the Empire that reached its present position of influence and power during the Victorian age. It is to the maintenance of this honourable position on a sound footing that we must direct our thoughts, not only on the twenty-fourth of May, but many times throughout the year.

What does our position within the Empire mean to us Canadians? This question will bring a great variety of answers. Few doubt the fact that "united we stand; divided we fall." As part of the Imperial unit we are free from many of the problems that vex small nations, and on the other hand suffer little from our nearest neighbor, and the balance is decidedly dominions, since we can modify our relations with them at will. The increasing importance accorded to Imperial preference in tariff schedules marks a growing appreciation of this tangible evidence of common interest.

The Canadian mineral industry is as yet comparatively little affected by inter-Imperial trade. Most of our interchange of mineral products is still with our nearest neighbor, and the balance is decidedly against us, principally on account of our imports of coal and iron. Empire Day might well be occupied by those involved in our mineral industry in a study of how to shift part of this account to British books. A good commencement has been made in the case of coal. A firm in Montreal advertises for sale Welsh anthracite, "not semi-anthracite", for domestic use. This inaugurates, we hope, a gradual capture by this unsurpassed domestic fuel of the market within range of Montreal. Coal is one of the few mineral products that can be exported from British mines or quarries. There are numerous possibilities for return cargoes of mineral products from Canada for the colliers from Wales. The thought concentrated on the problem on Empire Day may help to disclose some of these.

#### AN INTER-PROVINCIAL CUSTOMS DUTY EXISTS

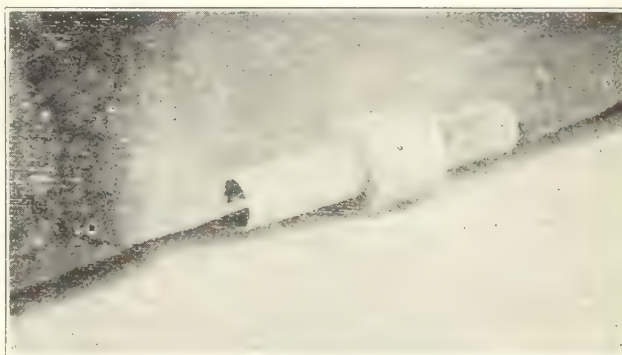
An instance of official neglect or maladministration in Ottawa is disclosed in the correspondence and other information we print today relative to shipments via the Panama Canal. Shippers and consumers both in the east and in the west of Canada are suffering from a restraint of inter-provincial trade via this route. It is stated that placing a Canadian customs officer in New York to supervise such shipments where they enter United States territory would right this anomalous situation, and would ensure the Customs Department against fraudulent declarations designed to circumvent the customs regulations. The few instances cited show that an important amount of inter-provincial trade is being hampered, and indeed prevented, by this unwarranted imposition of import duties. The case deserves the serious consideration of the authorities in Ottawa.

The Montreal branch of the Engineering Institute of Canada has now launched what promises to be an unusually useful propaganda. Last winter, its members interested themselves actively in the fuel question, and when the Canadian Institute of Mining and Metallurgy undertook to investigate the sources of fuel in Canada, they decided to look into the question of its use. Recently they issued their first report, describing the various domestic fuels available in the Montreal district, their comparative values, and their estimated cost. Some sound general directions for the use of fuel are included. Welsh anthracite at \$17.00 per ton gives the best value, with an annual cost of \$24.00 per 100 square feet of water radiator surface. American anthracite at \$16.25 per ton gives the least value, at \$32.50 per 100 square feet.

#### A NOVEL CLAMP FOR SHEET METAL

A simple but effective device for clamping the edges of thin sheet metal can be made from a short length of light tubing and a collar to fit. The accompanying photo, showing the clamp applied to the work, illustrates how it is used to aid in cutting off strips of this material.

Cutting duplicate strips of sheet metal by hand methods generally necessitates the use of some device enabling the work to be performed quickly.



Usually the first piece cut is used as a gauge for cutting the others. In such cases the clamp shown is useful as it is made to clamp the work and line up the edges at the same time. This is accomplished by sawing a slot in the tube and collar to take the work, and enlarging the diameter of the tube somewhere near the centre by punch or chisel marks, these raised portions of the metal being afterwards filed so that when the collar is pushed into this part of the tube the latter is squeezed together and thereby made to tighten on the sheets in the slot.

The tube used should be as light as possible, to afford easy gripping. The collar can be of any size and width so long as it fits the tube.

In use, the two pieces of sheet metal are lined up approximately at the edges and the device shown is slipped on until the edges of the metal strike the back side of the tube bore. When this takes place the collar is slid sideways onto the enlarged part to contract the tube, and close the slot, and so pinches and holds fast the two sheets in the slot.



# Exploration for Gold in Northern Quebec\*

BY H. C. COOKE.

The *Canadian Mining Journal* of April 13th contained a short paper describing briefly the results of our last year's field work in the Opasatica area of northern Quebec, particularly those results bearing on the occurrence of gold in the area, together with a number of suggestions to prospectors as to the best way of prosecuting the search for new deposits. The editor of the *Journal* has intimated that a supplementary paper is desirable, summarizing the facts and the possibilities of the whole district in a general way.

## Reports on The District

The accompanying sketch map shows the general distribution of the rock formations of the district. It has been compiled from the published maps of the Geological Survey and the Department of Mines, Quebec. The area from the Ontario-Quebec boundary east to Kewagama lake was explored by Dr. M. E. Wilson who also studied the area around Bell river; his results are to be found in Geological Survey Memoir 39, entitled, "The Kewagama Lake Map Area, Quebec," and in a paper entitled "A Geological Reconnaissance from Lake Kipawa via Grand Lake Victoria to Kanikwanika Island, Bell River, Quebec", in the Summary Report of the Geological Survey for 1912. The district between Kewagama lake and Bell river has been examined by Dr. J. A. Bancroft, whose observations are published in the Reports on Mining Operations in the Province of Quebec for 1911 and 1912, published by the Quebec Department of Colonization, Mines and Fisheries. Both of these writers did reconnaissance work only, examining and mapping the outcrops on the shores of the principal waterways and making only an occasional trip inland, here and there, to determine the nature of some prominent hill, to examine a mining claim or to map the rocks for a few miles along some township line.

## Extent of Pontiac Series

The information gained by Bancroft and Wilson indicates that the belt of schistose sediments, named the Pontiac series by Wilson, stretches in an unbroken belt some ten miles in width from near the inter-provincial boundary to the eastern boundary of Marrias township, a distance of approximately 100 miles. At the eastern end of the belt there appears to have been a sharp anticlinal cross folding, so that the sediments end suddenly against the underlying Keewatin greenstones. The greenstones outcrop over an east-west distance of at least six miles, around Christopherson lake, one of the headwaters of the Bell river, and east of them the Pontiac sediments appear once more around Matchimanito and Garden Island lakes for a distance of some 12 miles. They are then finally cut off by the northward extension of the great batholithic intrusion of granite.

In Opasatica area the bulk of the sedimentary rocks mapped as Pontiac series have been proved by our

work of last year to be identical with the Temiskaming series of Kirkland Lake. If the same condition held for the whole length of the belt, this paper would be largely unnecessary, as the description of the geology of Opasatica area, in the issue of April 13th, would apply also to the remainder of the belt to the east. This is not, however, the case. Our work last year showed pretty conclusively that the Pontiac series is made up of two sedimentary series of widely different ages. The older is composed of blackish, fine-grained, well-bedded slaty rocks that have been deposited without any marked break directly on the surface of the Keewatin lava flows. They have therefore been included in the Keewatin series of rocks under the name of bedded tuffs. In the eastern part of the Opasatica area the bedded tuffs, which lie on edge like all the older rocks, outcrop over a width of about half a mile from north to south. South of them lies the great body of metamorphosed conglomerates and graywackes termed the Temiskaming series which overlies the Keewatin rocks unconformably.

## Extent of Temiskaming Series

Lacking opportunity to carry on detailed work, however, the earlier explorers grouped together all the sediments, the bedded tuffs and the Temiskaming series, in the Pontiac series. It is consequently not known what proportion of the Pontiac belt of sediments to the east of Opasatica area consists of Temiskaming series, and what is bedded tuff. Bancroft reports occurrences of the schistose conglomerate of the series as far as the eastern border of Bousquet township, so that the bulk of the Pontiac is probably Temiskaming series for 25 miles east of Opasatica map area. In the next 50 miles, however, no conglomerate has been reported and all that is positively known is that much of the Pontiac series at least consists of the bedded tuffs. A little conglomerate is reported by Wilson as occurring on Garden Island lake, near the extreme eastern end of belt, indicating that the conglomerate is probably continuous throughout the whole belt, although perhaps so much thinner than in the west that it happens to be drift-covered along the watercourses. Probably, therefore, the southern part of the band of Pontiac series is Temiskaming series throughout, the northern part of bedded tuffs, from Bousquet township to Marrias township; but the actual width of each formation is as yet unknown.

## Value of Tuff For Prospecting

One can only speculate yet whether the areas of bedded tuff will repay prospecting. It may be presumed that, since the tuffs are bedded, the intrusive gold-bearing porphyries would tend to form large sills rather than small dikes in them; on the other hand, they may be so difficult to fracture across the bedding that porphyry masses may have not entered them at all, or to a very slight extent. The tuffs are comparatively soft, so that a shear zone in it would almost certainly be well defined; on the other hand such soft

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rocks yield so readily under shearing stresses that great widths of sheared material may be expected in many instances, and this, as indicated in the previous paper, is usually unfavorable for the formation of a paying ore-body. Since the tuff is soft, veins running into it may be expected to break up into branching networks of small veinlets, or to form a succession of short lenses, very unfavorable for mining purposes; but the fine-grained tuffs are also readily replaced by mineral-bearing solutions, so that a comparatively small vein may be bordered by a sufficient width of replaced and mineralized rock to become a paying proposition.

The tuffs, therefore, which form a considerable part of the Pontiac series east of Bousquet township, are most or less an unknown quantity so far as their prospecting possibilities are concerned. They present both favorable and unfavorable characteristics, and only thorough prospecting, resulting in the discovery or non-discovery of ore deposits, will show finally which characteristics have been the most influential, while more geological work is required to delimit the boundaries of the areas of tuff.

#### Hints to Prospectors

The known facts of the geology of this district, so far as they relate to prospecting, may be briefly summed up therefore as follows.

The band of sedimentary rocks known as the Pontiac series extends easterly from the interprovincial boundary for 120 miles, with a break 6 or 8 miles wide around Christopherson lake, a headwater of the Bell river.

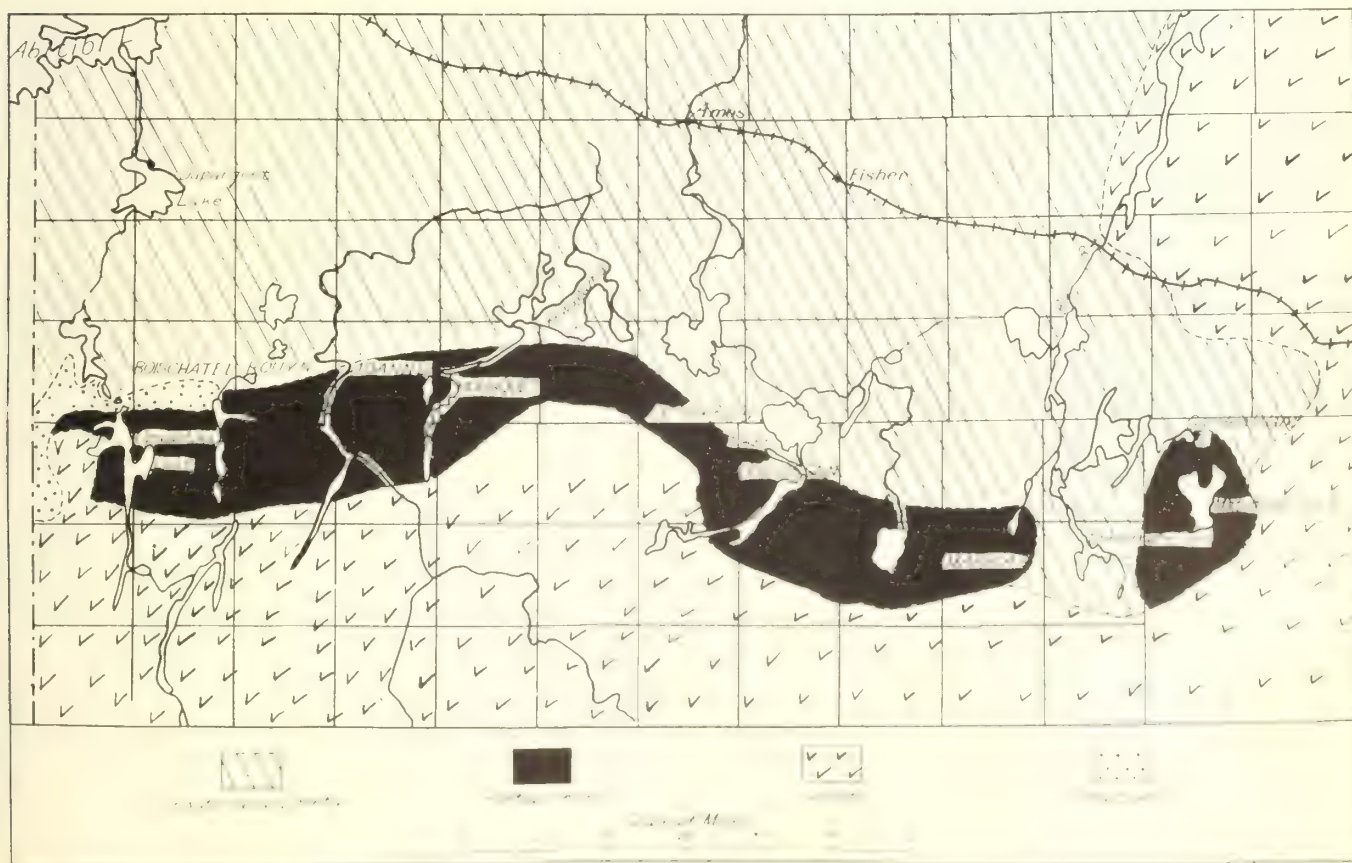
Gold discoveries of probable value have been made in the Keewatin series near the Keewatin-Pontiac

boundary in three localities; near the western boundary of Boischatel township, in the northeast corner of Rouyn township, and in the northern part of Dubuison township. In each of the two latter areas there have been several discoveries.

Throughout Opasatica area and for 25 miles further east, as far at least as the eastern boundary of Bousquet township, the bulk of the Pontiac series consists of the Temiskaming series, and prospecting in the sediments should be confined mainly to the belt of conglomerate about a mile in width along the northern edge. East of Bousquet township a larger proportion of the belt of sediments appears to consist of the Keewatin bedded tuffs, and only prospecting can show whether ore-deposits are likely to be found in them or not.

The occurrence of gold in the Keewatin lavas at such widely separated points suggested strongly, however, that prospecting might be carried on with profitable results throughout the whole belt of Keewatin rocks bordering the Pontiac sediments. All the discoveries so far, it will be noted, are on or close to easily travelled water-courses. It is highly improbable that these are all the deposits in the region; on the contrary, the discovery of no less than three gold-bearing localities, when there are only some 8 or 10 navigable watercourses crossing the belt, strongly suggests the advisability of prospecting the whole belt intensively. There are large areas as yet entirely unexplored between the navigable streams, in which the chances of finding gold are equally as good as in the much-staked Rouyn area.

The prospector entering these areas must be prepared, however, to encounter considerable difficulty.



Sketch Map of the Quebec Gold Belt, indicating the Principal Geological Features and the Main Canoe Routes



It is most discouraging to traverse miles of clay land, and find only a few small and widely scattered outcrops of rock, when the ground is covered with a growth so dense that with the utmost exertion one may scarcely make a mile an hour. Yet this difficulty is what the prospector in this area must expect to meet and overcome, if the area is to be thoroughly examined; it has, indeed, been a main cause in the past for the failure of further prospecting after promising discoveries had been made.

#### A Northern Gold Belt?

The apparent connection that seems to exist between the localities where gold has been found and the general east west structure of the country, suggests another possibility to be investigated by prospectors at some future time. If there really is any connection between structure and gold deposition, then an east-west line drawn through the Porcupine district and projected eastward may prove to be another belt along which gold deposits may be expected to occur. It is interesting to observe that the Lightning river discoveries are approximately on this line. Such a line, projected into Quebec, passes along the north side of Duparquet lake and crosses the National Transcontinental Railway between Amos and Fisher. Much of this district is very heavily covered with clay, but it might prove profitable to prospectors to examine the hilly parts at some time in the future for possible occurrences of gold.

### INSTITUTE MEMBERSHIP

#### Address by Thomas Graham to the B. C. Division C. I. M. and M.

The annual business meeting of the British Columbia division of the Canadian Institute of Mining and Metallurgy was held in Vancouver on May 14th. In addressing the meeting after his election to the chairmanship for the ensuing year, Mr. Thomas Graham said:

In accepting at your hands the office of chairman for the coming year, I desire to express my deep appreciation of the honour you have conferred upon me. While sensible of my own limitations, I shall to the best of my ability endeavour, during my term of office, to advance and promote the best interests of the Institute and its members.

First, permit me to pay tribute to the retiring Chairman and his executive officers. Their untiring efforts during the year have done much to advance the welfare of the Division. Particularly are they to be complimented and congratulated upon the success that attended the Western General Meeting held in this city last fall.

I cannot leave this subject without making reference to the work of our Secretary-Treasurer, Mr. H. Mortimer Lamb. The Division is to be congratulated on having in this important position a man who is so self-sacrificing in time and energy as Mr. Lamb. His able report submitted today gives much food for thought in connection with the future activities of the Division, and it is to be hoped that more local branches can be established through the Province, as they undoubtedly do much to maintain interest in Institute matters. I feel that Mr. Lamb's work as Secretary-Treasurer has been wholly responsible for the renewed activity shown during the past two years in Institute matters in the British Columbia Division.

The subject of Institute policy has been much to the front throughout the past year, and judging from the diversity of opinion among members and the difficulties

in arriving at a fixed policy, it would appear as if there were other complex problems in the world besides those we have often heard so ably treated at meetings of this Institute by Professor Thompson.

The question as to whether or not additional numbers in membership will be a cure for all the ills that at present seem epidemic in the Institute threatens to be a live subject for discussion for some time to come. There is a well defined line drawn upon the subject, and one that it is to be hoped will be approached with that tolerant spirit towards the other fellow's view point that should characterize all our discussions. The various views advanced are well known to you all, and in giving these some thought I am led to think that both within and without the Institute there are many who do not quite grasp the full significance of membership and what it implies.

Most of us expect too much from the Institute without any effort to put anything into it in return. It is an honour to be a member of the Institute, and being honoured in enrollment in its membership, the Institute has a right to expect something from the member in return. The Institute can only be a responsible body insofar as it represents the responsible thought of its members. The Institute exists for this purpose. It is the inspiration of our efforts that holds us together, the knowledge that we are, through responsible thought, building up an influence for good. We want all men of responsible thought, who may and can add their quota to the sum of our experience, to join us, and such men with the interests of the mining industry at heart should feel it their duty to do so, and we welcome them to our ranks, so that the Institute may fulfil the great work that it can perform for the mining and metallurgical industry of Canada.

There may possibly be temporary set-backs to the development of the mining and allied interests in this country, but they can only be temporary. Industrial development of our country is so largely dependent on mining that we cannot hope to obtain and maintain the progress awaiting us if we neglect the mining industries. Therefore, I believe we have reason to look hopefully forward to a period of mining development throughout the Dominion, and an active Institute such as ours should be prepared to play a prominent part in guiding and directing that mining development along lines calculated to bring the greatest possible good to our Province, our Dominion and the Empire.

### MONEL METAL FOR SAFETY LAMP GAUZE

A new and important use has been determined for Monel metal. A report of the Bureau of Mines, Washington (Serial Number 2468) gives the result of an exhaustive test of Monel metal gauze in safety lamps for use in coal mines, in comparison with steel gauze, and the conclusions are as follows:

"Monel metal is a very satisfactory material for flame lamp gauzes. Monel metal gauzes provide as great a degree of safety in gaseous and coal dust laden mixtures as do steel gauzes, and in addition they do not corrode perceptibly in humid atmospheres.

"Monel metal gauzes maintained their shape and stiffness under the greatest heat to which they were submitted in gaseous mixtures equally as well as steel gauzes did; this together with the fact that they do not corrode perceptibly in humid atmospheres should assure a much longer life for Monel metal gauzes.

"It is believed that the use of Monel metal gauzes in flame safety lamps would be a step toward greater safety and that their use should be encouraged."



# Customs Duty Imposed on Inter-Provincial Trade

ANOMALOUS RULINGS IN OTTAWA INJURE  
CANADIAN PRODUCERS IN BRITISH COLUMBIA  
AND NOVA SCOTIA

(Specially Written for the Canadian Mining Journal.)

The statements appearing in the Eastern Press, relative to the collection of duty on Canadian goods by Dominion customs officials, if such goods are shipped, whether in bond or otherwise, via New York through the Panama Canal, are founded on fact. Although western merchants, through the Boards of Trade and strongly supported by newspapers, are making a determined fight to have a Canadian customs officer placed at New York in order that this restriction of inter-provincial trade by the water route may be removed, there is as yet no intimation that the effort will be successful.

Hon. John Oliver, Premier of British Columbia, first turned the limelight on this state of affairs when, in the course of addresses advocating an equalization of freight rates as applied to this Province, he declared that duty had been collected on steel rails shipped from Eastern Canada via New York to Canada on the Pacific Coast. He pronounced this an injustice, said that it was an unwarranted interference with the free interchange of trade by cheaper transportation channel between two parts of Canada, and asserted that it was contrary to the intent of the framers of the British North America Act.

Not to allow the matter to rest with a mere declaration of the fact, Premier Oliver addressed a protest to the Rt. Hon. W. L. Mackenzie King, Premier of Canada, and from him received the following reply:

"Customs Department has arranged for refund of customs duty in case of steel rails referred to in your telegram April twenty-sixth and has in course of preparation regulations respecting goods shipped from one part of Canada to another which it is hoped will satisfactorily meet the other matters to which your wire directs attention."

## Premier Mine Forced to Buy American Goods

It is stated on good authority that the Premier Gold Mining Company proposed purchasing from a Canadian firm at Owen Sound twenty tons of grinding balls, but after finding that they would have to ship all-rail or else ship via New York and the Panama Canal and pay Canadian duty on Canadian goods, they found it cheaper to buy American goods in the United States and pay the duty.

Another concrete case quoted is that in which the Gosse-Millerd Salmon Co., of Vancouver, is the principal. This company addressed an inquiry to the Minister of Customs regarding the status of a shipment of salmon from this province via the Panama Canal and New York to Eastern Canada as to duty charges and received the following reply:

"Under present regulations and conditions canned salmon shipped from British Columbia to Halifax via Panama Canal and New York would not be admitted to Halifax without payment of duty."

A Vancouver newspaper, "The Sun", pressed this matter by telegraphing the Hon. Jacques Bureau, Minister of Customs, Ottawa, in the following terms:

"Referring to your wire Gosse-Millerd stating that

duty would be charged on salmon shipped to Halifax via Panama Canal, please refer section 121, British North America Act reading, 'All articles of growth, product or manufacture of any one of the provinces shall from and after the Union be admitted free of duty into each of the provinces.' With this before you, will you as responsible Minister of the Crown and member of the Liberal party state what your future policy will be with regard to this matter? Kindly wire today."

To this the following reply was received:

Ottawa, April 27, 1923.

Vancouver Sun,

Vancouver, B. C.

"In absence Minister would state that section 121 British North America Act held to refer to movement of goods within Canadian territory and not to shipment via foreign territory."

"Wm. Ide

Private Secretary"

## Customs Officer in New York Advocated

The present situation as to the shipment of salmon to Eastern Canada is set out in the appended communication, dated May 9th last, from W. D. Burdis, secretary of the B. C. Cannery Association.

"In reply to your inquiry respecting the disability placed upon B. C. canned salmon shipped to Eastern Canada via the Panama Canal, by reason of the duty charged on such goods, I assure you such is the case, with the result that, so far as I can learn, no canned salmon has been shipped by that route.

"Had such a regulation not been in effect, sellers here could have done considerable business in Eastern Canada, in canned salmon and other lines, but the regulation effectively debarred our people from availing themselves of the cheaper rates quoted via Panama, viz. 60 cents per 100 lbs. vs. \$1.30 overland by rail.

"I have this morning received a circular letter from Dingwall Cotts & Co., containing a copy of a communication dated May 1st, 1923, that the company has just received from the Department of Customs in Ottawa, stating that goods shipped on a British vessel from Montreal to Vancouver, not landed or transhipped at New York, via the Panama Canal will be admitted here free of duty, but as you will see the reply was in respect to a vessel, the 'Margaret Coughlan', with a full cargo aboard, and does not indicate the position in respect to parcels of goods shipped from Vancouver to Eastern points. Dingwall Cotts & Co. at my request, are writing their agents to ascertain from the Department, whether goods from here will be similarly favoured, say in Montreal.

"I enclose you a cutting from the Sun of April 20th., 1923, which shows the case cited by Gosse-Millerd, Ltd. whereby they lost a sale of goods to a Halifax firm, on account of duty being chargeable on shipments made via Panama.

"I understand the matter is being seriously investigated by the Minister of Customs, who in today's World is reported to have stated a decision will be



dominated and shortly which he expects will be satisfied.

Nothing but the right to ship Canadian-made goods either way in hand, by any vessel via Panama to points in either Eastern or Western Canada, free of duty, will fill the requirements, or better still, the appointment of a Canadian Customs Officer in New York, to deal exactly in the same manner that a United States Customs officer does in Vancouver with shipments of goods entering this port. The cost of the latter officer here, about \$4,800 a year, is paid by the C.P.R. to facilitate shipments over their road of American goods, so the cost of an office in New York would not be a serious item of expense for so great a benefit to Canadian inter-provincial trade."

Hon. Jacques Bureau, Minister of Customs, is quoted in the West as being far from enthusiastic over the proposal that a customs officer be appointed at New York. It is said that he is inclined to refuse the request, justifying his position by the contention that traffic would be diverted towards the United States and that all the Canadian railroads would get out of it would be the haul from the point of departure to the boundary. The whole of the railway haul to the sea and the whole of the ocean freight would go, it is argued, to the United States.

#### Use of Nova Scotia Steel in B. C. is Prevented.

A. B. Weekes of the Canadian North West Steel Company, sets out British Columbia's position as follows:

"We have to buy our iron and steel in England because we can get it delivered here more cheaply than if we bought it from the Dominion Steel Co. of Nova Scotia.

"We cannot afford to pay the rail haul from Sydney to Vancouver and we are not allowed to ship by water through the Panama Canal. If we do try this, when the goods arrive here they are considered to have originated in the United States and we have to pay the full duty. By bringing the goods from England the transportation costs are little greater than from Halifax and the duty is much less.

"The actual difference between the duty we pay on material purchased in England and what we should have to pay if we purchased in Nova Scotia and shipped by the Panama Canal is the difference between \$2 and \$3 on low duty goods and between \$4.25 and \$7 on high duty goods.

"It is of no use for us to tell the customs officer here at this port that we purchased the stuff in Nova Scotia. They say that the ship called at New York or some other American port and they don't know what may have happened there. Maybe the goods purchased at Halifax were taken off and other goods made in Pittsburg were substituted. They have no knowledge.

"That is why the Canadian Government is being so insistently asked to put a customs office at least at the port of New York, the chief transshipping centre. Such an officer could supervise the transshipping activities and certify to the identity of the merchandise.

"The suggestion that the Government refuses to take this step in order to compel us to use the Canadian railways instead of the American ships does not work out, for we do not buy in Nova Scotia. We cannot afford to do so. Our goods are not handled on one mile of Canadian railway. Not only do the railways lose the short haul from Sydney to Halifax, in our case for instance, but the Canadian steel producer loses the British Columbia market to the British producer."

#### NEW REPORT ON SYDNEY COAL AREA

A recent and timely publication of the Geological Survey, Ottawa, is Memoir 133. "The Southern Part of the Sydney Coal Field, Nova Scotia," by A. O. Hayes and W. A. Bell. This describes an area of 200 square miles immediately to the southeast of Sydney, which has not been examined by a government geologist since Hugh Fletcher mapped the Sydney field in 1895-7. As much information has been gained since that time, principally by drilling, the present survey was commenced by Dr. Hayes in 1917, and finished by Dr. Bell in 1921.

Of the four coal fields of Nova Scotia at Springhill, New Glasgow, Inverness and Sydney, the last is the youngest. The Port Morien part of the Sydney field, with which the present report deals, has been estimated to contain 254,420,000 metric tons of coal in seams one foot or over in thickness.

The survey shows that, among several dozen seams determined in this basin, only four are workable. The lowest, the Tracy seam, underlies an area on land and within workable limits under the sea of 100 square miles. Over only the Eastern half of this, however, is it of workable thickness, from 4 to 6 feet, containing a total amount estimated at 100,000,000 tons. The Spencer seam, next above, is confined to a much smaller area and is quite variable in thickness. It contains from 50,000,000 to 100,000,000 tons of coal in both land and submarine areas. The Gowrie seam, on which the Dominion Coal Company is operating two collieries, Nos. 21 and 22 at Birch Grove, is likewise in the narrow syncline, pitching seaward. It is from five to six feet wide. The Blockhouse seam, above, is nine feet thick. Both these seams are capable of profitable mining in the submarine areas, and the Dominion Coal Company has acquired the mining rights over a large part of both the land and the submarine areas.

Special mention is made of the systematic and well-directed exploration by drilling in this field by Mr. W. N. Macdonald of Sydney. In an appendix is described briefly the Bras d'Or coal district 15 miles northwest of Sydney. Here two workable seams, the Stubbart and the Bonar seams, contained, within the combined land and submarine areas, a total of 35,000,000 tons.

#### POSITIONS OPEN AT OTTAWA

Applications will be accepted up to June 7th by the Civil Service Commission, Ottawa, for two positions on the staff of the Department of Mines.

5367—An Assistant Chemist for the ore dressing and Metallurgical Division, Mines Branch, will be engaged at an initial salary of \$2,100, to be increased at the rate of \$120 annually and supplemented by whatever bonus may be provided by law. University graduation or its equivalent and three years' subsequent practical experience are required of the candidate, who will do analyses and research work in the laboratories of the Branch.

5368—A Junior Engineer, Borings Division, Geological Survey, with an initial salary of \$1,680, will be appointed to make laboratory examinations of deep-well borings. A graduate in geology with some experience in field work is required.

Application forms are available in the post-offices of the larger cities, at any office of the Employment Service of Canada, or direct from the Civil Service Commission in Ottawa.



# NEWS AND COMMENTS

By ALEXANDER GRAY

## Indian Mines, Portland Canal.

The competition for Portland Canal, British Columbia, mining properties is unusually keen. It may be cited, for example, that three international financial firms have asked for terms on Indian Mines and the ground that company controls. It is not the purpose, however, of the Montreal and Toronto owners to part with the property that is undergoing development, where the prospects are reported to be progressively satisfactory. A new compressor plant has just started and a lower tunnel is being driven on ore that is said to average at least \$15 for a distance of about 400 feet. This tunnel will be carried along for a further four or five hundred feet, to points underneath surface outcroppings of excellent grade. Instead of entertaining proposals whereby control would pass out of their hands, Canadian owners have decided upon a policy of development and the provision of a concentrator that can be added to when additions are required. Meanwhile it is likely that the higher grade ore will be shipped to the most convenient smelter, the desire being to make the mine carry some of the cost of development, although arrangements have been made to finance fully the company's requirements. It is pointed out that the lower tunnel is being driven on only one of the known ore-bodies, the values in which are mainly in gold. Not only are Indian Mines putting profitable ore in reserve, but adjoining properties have been acquired by the company and the Premier company. The Northern Lights area is held by the Premier Company, which is driving a tunnel at a depth of several hundred feet below its present workings. With what it has and what it expects—including the possibilities of several properties taken under option—Indian Mines may be reorganized in the near future; but control will rest with Canadians until the milling stage is nearer.

\* \* \*

## Mr. Timmins Returns.

When President Noah A. Timmins of Hollinger Consolidated was going aboard a liner at New York, on pleasure bent, an alert reporter rushed to the gangway and informed him the big news was out; Solomon Barnato Joel and associates of London were to purchase control of the premier gold mine of the American Continent for \$30,000,000. It was all fixed, according to Porcupine sources of intelligence. The Barnatos, greatest factors in the diamond world and chiefs of one of the Rand Groups, were ready to close the deal, and it was even asserted that Mr. S. B. Joel had visited Porcupine incognito.

Mr. Timmins did not engage in a lengthy interview with the reporter. He tersely stated: "It might take more than that amount to buy my own interest, were it for sale."

The story was not to be so lightly disproved. It continued to make the rounds, was revamped, embellished, appeared in Wall Street, and London would have it the matter was as good as closed, notwithstanding Hollinger market value at the moment was about \$67,000,000, to say nothing of the treasury surplus.

Mr. Timmins proceeded "en famille" to Rome, thoroughly enjoyed the respite from his responsibilities, saw the Riviera and Paris, and eventually sojourned in London, where he had the pleasure of meeting Mr. Joel, whose

guest he was at one or two events. Here it may be explained that Manager Brigham of the Hollinger is well known to Mr. Joel. At times Mr. Brigham managed individual De Beers diamond mines, and he was manager of Jagersfontein Mine, which De Beers owns. It was perfectly in order, therefore, that Messrs. Joel and Timmins should meet, exchange views, talk mines and mining. Neither discovered that either sought to buy or sell control of Hollinger.

Mr. Joel is a keen sportsman and mining investor. He does not plant millions without due thought—and consultation with principals; and as for Hollinger control, he assumed it was not on the bargain counter at a discount such as the price mentioned represented.

Really and truly, however, he was asked to participate in a recent London flotation. The sponsors for this were satisfactory to Mr. Joel. Upon reflection he decided not to join in that Porcupine undertaking, the shares of which have been soaring to several times their issuing price. No doubt the reports associating Mr. Joel and his colleagues with the entirely mythical Hollinger transaction served its purpose; they helped the London market for the new issue.

\* \* \*

## London Accumulating Canada

Whether or not London sought a majority portion of Hollinger (eleven years after London jettisoned what Hollinger stock Bewick, Morcing took over) there is no denying London's powers of absorption of prospects and properties. Mr. H. G. Latilla is busy with sundry matters. Having eliminated a troublesome element in its Davidson adventure, the Michelson party is less prominent; yet there is satisfaction in self-purification. All the Rochester Veteran proposition is held over there, current market valuation of the shares being a tribute to the manipulative abilities of the principals involved. Part of Monea has gone overseas. John Taylor & Sons and affiliated interests have responded to the "call of the wilds." A market is to be made for Dome shares. The annexes, as it were, are favored, not only in Northern Ontario districts but throughout the Portland Canal. Areas round the Premier Mine of Portland Canal are the vogue. This is attributable in part to the Selukwe holdings of B. C. Silver, concerning which the Selukwe annual report had this:

"An active development campaign is in progress on the B. C. Silver Mines, northern area, comprising exploratory work by diamond drilling, and by driving a tunnel 1,200 ft. in length. On 17th January, 1923, a cable was received stating that an ore formation 43 ft. in width and averaging \$31 per ton over the last 25 ft. had been encountered. Shortly afterwards a pocket of bonanza ore assaying up to \$180 per ton was located. Driving and crosscutting along the formation is proceeding, and the face on 14th March was 205 ft. from Station 312. The recently acquired claim, known as Cascade No. 5, is, report states, apart from any mineral prospects, the natural deep adit level approach to the B. C. Silver Mines claims, and is also of great prospective value as a mill and power site, aerial tramway terminus, and for its water-rights, timber, and other advantages.



# Reported Discovery of Placer Gold in Labrador<sup>(1)</sup>

OFFICIAL STATEMENT FROM THE GEOLOGICAL  
SURVEY, OTTAWA.

As the Geological Survey is receiving from Canadian prospectors and investors many enquiries for information regarding the reported discovery of placer gold near Stag bay, Labrador, it has been decided to make public what information it possesses regarding the reported discoveries and the geological features that have a bearing on the probable existence of placers. The claims that have been staked have been recorded with the Government of Newfoundland; consequently the Geological Survey of Canada has made no field investigations in the area since the discovery was reported, and has no first-hand knowledge of the alleged placers. During the past, however, officers of the Survey and geologists from other institutions have explored the Labrador coast, and a good deal is known about its geological features.

Stag bay lies 30 or 40 miles west of Cape Harrison, north of Hamilton inlet. It is described by A. S. Packard, who entered it, as a wide sound bordered by lofty, terraced hills. Robert Bell<sup>(2)</sup> made observations at points along the Labrador coast. A. P. Low<sup>(3)</sup> along the coast and on lake Melville and more recently (1921) E. M. Kindle on Lake Melville and along the coast south of Hamilton inlet. Our knowledge of the geology of the southern part of the coast is based largely on work done by A. S. Packard<sup>(4)</sup> and by R. A. Daly<sup>(5)</sup>, and of the northern part of the coast by A. P. Coleman<sup>(6)</sup>.

The existence and preservation of placers are affected in large measure by glaciation, for the reason that glaciation, or ice action, tended to carry away and destroy any placers that accumulated before the ice age, and there has not been time enough since then for the new ones to form. Most geologists believe that all except the elevated parts of the very northern stretch of the Labrador coast was intensely glaciated by a continental ice-sheet that moved seaward in a direction at right angles to the general northwest trend of the coast.

Dr. Coleman, who spent parts of two summers in a study of the northern part of Labrador and the adjacent part of Quebec, after briefly describing the plateau of the Canadian shield, says:

"The loftier parts of this tableland rise near the coast from mount Thoresby (2 733 feet) near Nain to Ryan bay near Eoluse harbor (four peaks said to

be from 5,000 to 6,000 feet in height), with a length of about 230 miles from southeast to northwest. It must not be supposed, however, that these higher points form a distinct range of mountains. In most cases they are merely a mountainous fringe on the seaward side of a somewhat narrow tableland, and they are broken up into shorter or longer sections separated by lower areas. From southeast to northwest may be seen the Kiglapaits, north of mount Thoresby; the Kaumajets, near Okak and Mugford, and the highest portion of all, named the Torngats by Daly and others, extending from Saglek bay to Ryan bay, with a length of nearly 100 miles."

Most of Dr. Coleman's work was devoted to the central part of the mountains known as the Torngats. With regard to glaciation of the northern part of the coast he writes:

"The evidence of the glacial action is absent from a considerable area in northeastern Labrador, since the higher tableland and the tops of the mountains which fringe it on the Atlantic side show no marks of having been overridden by an ice-sheet. The area left unglaciated cannot yet be exactly outlined owing to the absence of observations over most of the region; but it is known that along a coastal belt extending from Saglek to Komaktorvik, a distance of 80 miles, there is no appearance of ice action above the valleys. At Nachvak this unglaciated condition is known to reach at least 50 miles inland, giving a driftless area of perhaps 3,000 or 4,000 square miles. The tops of the Kiglapait and Kaumajet mountains to the south and of the Four Peaks to the north, as well as many other isolated peaks, probably rose as nunataks above the surrounding ice.

"The unglaciated character of the higher levels at Nachvak and northward was noted by Leiber and Bell, who remark upon the jagged character of the mountains as incompatible with the passage over them of an ice-sheet. Daly goes more fully into the question and reaches the conclusion that Nachvak glacial ice did not reach higher than 2,100 feet above sea-level. The idea suggested by these writers that the Labrador ice-sheet made its way through depressions in the tableland, such as Nachvak fiord, and reached the Atlantic is not borne out by the writer's observations.

"Though the northeastern peninsula of Labrador was not covered by the great ice-sheet, its depressions were occupied during the Ice age by long and large glaciers which scoured out the valleys and in many places left deposits of boulder clay and moraines. This work seems to have been done, in part at least, toward the end of the Glacial period, as shown by the unweathered character of some of the deposits and of the lower glaciated surfaces; whereas old looking, strongly indurated till in other places was probably laid down earlier.

(1) Statement issued by the Geological Survey, Ottawa, May 7, 1923.

(2) *Geol. Surv., Can., Rept. of Prog., 1882-83 84, Part DD.*  
*Scottish Geog. Mag., Vol. 11, 1895*

(3) *Geol. Surv., Can., Ann. Rept., Vol. 8, Part I.*

(4) *Observations on the Glacial Phenomena of Labrador and Maine.* Boston Soc. Nat. Hist., Memoirs, Vol. 1.  
*The Labrador Coast, a Journal of two summer cruises in that Region, 1891.*

(5) *Geology of northeast Coast of Labrador: Mus. of Comparative Zoology, Bull. Vol. 38.*

(6) *Geol. Surv., Can., Memoir No. 124.*



"The small existing glaciers may be looked on as remnants of these far greater valley glaciers.

"South of the unglaciated area mentioned above, there can be no doubt that the continental ice-sheet reached the sea, since even hill tops present moutonnée forms and erratic blocks, through striated surfaces are seldom seen except on the lower levels. Distinct moraines and boulder clay are not common, probably because the region was one of erosion rather than deposit but morainic material and till may have been deposited off what is now the coast on the submerged continental shelf."

A. S. Packard says that the "whole Labrador Plateau has been molded by ice to a height at least of 2,500 feet above the level of the sea.... Only at one point near the northern termination of the Peninsula at Cape Chudleigh have the mountains by their altitude escaped the rounding and remodelling action of glaciers." He and others point to the rounded character of the hills, the roches moutonnées, the glacial striae, the lunoid markings and the transported boulders as convincing evidence of glaciation.

R. A. Daly, in describing the coast from Belle Isle to Paul's island which includes Stag bay, says that "from any commanding hill on island or mainland, the eye ranges far and wide over a surface showing everywhere the evidence of universal and profound glaciation. Unobscured by forest, soil, or thick drift, and singularly expanded because of the crystalline clearness of the atmosphere, the view typifies that which may be had in the Laurentian Highlands of Canada or in the Archaean of the Scottish Highlands. It is a great wilderness of innumerable rounded, ice-worn hummocks, generally gneissic in composition. Among the roches moutonnées lie equally countless ponds and bogs connected by the small streams of a most disordered drainage."

Packard, Daly, Coleman, and Kindle call attention to the paucity of glacial deposits other than boulders. The area was evidently, as Coleman states, one of erosion rather than deposition and the great bulk of the loose material resulting from pre-Glacial weathering may have been swept, as suggested, to the sea and deposited on the submerged continental shelf.

It is thus seen that conditions have been produced in that part of Labrador extending from the south end to much farther north than Stag bay similar to those existing in northern Ontario. Both are underlain by pre-Cambrian rocks and both have been subjected to intense glaciation. Geologists and prospectors have learned to look upon northern Ontario as unfavourable ground for prospecting for placers. Placers that may have existed before the Ice age are believed to have been destroyed and scattered by the eroding action of the great mass of moving ice.

A few placers have been formed since the Ice age but they have never paid to work because the gold is scattered through the glacial drift and has been only slightly concentrated in the Recent gravels. It is very unlikely that placers have been formed in Labrador since the Ice age. As has been pointed out, the coast of Labrador, except the very northern part, has been swept clean of nearly all unconsolidated material, pre-Glacial and Glacial, except boulders; there is little likelihood, therefore, of placers having been formed by a resorting of glacial debris, and sufficient time has not elapsed since glaciation for the breaking

down of great thicknesses of rock necessary for the formation of new placers.

Rich placers do occur in some glaciated regions, for example in the Cariboo district of British Columbia, but the Labrador region was more intensely glaciated than the Cariboo. Cariboo is a mountainous region with deep and narrow valleys and the ice-sheet could not move freely because of these deep valleys and because it was hemmed in by mountains. In Labrador the ice could move freely and its scouring action was pronounced. Although it cannot be said that placers will not be found in Labrador, the chances for the occurrence of rich ones seem very remote.

In view of the above some of the statements that have appeared in advertisements of the reported Labrador placers seem improbable. It has been implied, for example, that there may be considerable areas of gravel, 21 feet thick carrying \$100 in gold per cubic yard. Neither does the evidence of the actual discovery of placer gold, as given in advertisements by promoting companies, appear satisfactory. It is apparently based mainly on a statement claimed, in advertisements, to have been made by Ledoux and Company, New York, concerning an assay of a sample of gold-bearing gravel from Labrador. Correspondence, however, with Ledoux and Company has elicited the information that they had been unable to find any record of such a sample having been submitted to them either by H. C. Bellew or Richard W. Edwards.

### A BELLEW CIRCULAR

*The following circular, of recent date, is not likely to hook many "suckers," now that H. C. Bellew has been publicly exposed so thoroughly.*

Montreal, May 15th, 1923.

#### Particulars of Syndicate to Finance Prospecting Expedition

Positive and reliable information has come to me of a very rich deposit of alluvial gold soil in a certain part of the Province of Quebec, which, for the protection of the discoverer, until such time as proper staking can be done, is being kept sacredly secret by the few who know of its existence.

I have been favored with the confidences of the discoverer and know from the geological formation of the district in question that it is entirely likely that the report is authentic.

Therefore, I have consented to organize and equip an expedition that will immediately set out to secure as much of the property as is considered valuable to us.

To do this will require a fund of at least \$5,000.00, and I propose to raise this sum by means of a little private syndicate and, if necessary, to even raise an additional sum of \$5,000.00 as a reserve in case that further capital might be required, but for the present the initial sum will be confined to just \$5,000.00.

There will be one hundred interests in the Syndicate of one hundred dollars each and I am now offering just fifty of these interests to provide this first five thousand dollars. Each member subscribing one hundred dollars will have one claim of at least 200 acres staked and recorded in his or her name and this claim will remain his or her personal property.



There will be at least one hundred claims staked, fifty of these for the individual members of the Syndicate and of the balance at least twenty five claims are to be set aside for the operative members of the expedition as full remuneration for their services, the balance to be held in trust by me as an undivided asset to form the nucleus of a new company in which the Syndicate members will further retain an undivided fifty percent (50%) interest.

A competent Mining Engineer will accompany the expedition and only good ground showing evidences of gold will be staked.

Already several of my friends have subscribed to this fund and it is desirable if favorable consideration is to be given this proposition by you that you will be good enough to let me hear from you by return mail.

Any one may subscribe for one or more interests while they last.

Make all cheques payable to the order of H. C. Bellew, and I will send you a receipt embodying the foregoing and I will personally guarantee the fair carrying out of the undertaking to your entire satisfaction.

H. C. BELLEW.

### PERSONAL AND GENERAL

Col. J. J. Penhale is in Thetford, Que., doing some special work for the Asbestos Corporation of Canada.

Mr. A. G. Langley, resident mining engineer at Revelstoke, B. C., has accepted an invitation to attend and to address the Northwest Mining Convention to be held commencing the 22nd inst. at Spokane. Mr. Langley will discuss the present conditions and the outlook as to mining in the Kootenay section of British Columbia.

Mr. W. A. Carlyle, who was provincial mineralogist for British Columbia during the years 1896-97, and who has since been prominently connected with mining in Spain, England, and Eastern Canada, is in Victoria. He expects to spend the summer in that city.

Dr. Victor Dolmage will take charge of the British Columbia branch of the Canadian Geological Survey, taking the place of the late J. D. MacKenzie. No announcement has yet been made as to the plans of the Survey for field work in British Columbia this summer, but some intimation of what is intended is expected when Dr. Dolmage has had time to settle down to the discharge of his new duties.

Mr. Alexander McEachern, Chief Inspector of Mines, Dominion Coal Company, Nova Scotia, is in Ottawa to give evidence in the inquiry being made by the Senate Committee on Fuel. Mr. McEachern was in charge of No. 2 shaft when it was being sunk and afterwards developed No. 2 Colliery, Sydney, which is the largest colliery in Canada. He should make a very useful witness, as he has had an extended practical experience in coal mining, and has a thorough knowledge of most of the coal fields of Nova Scotia.

Mr. Stewart Troop, who discovered the silver showing on Wigwam Lake in the Gowganda district, Ontario, has severed his connection with the present owners of the property and is now in Moncton, New Brunswick.

Mr. E. G. Riebe, consulting engineer of the Silver Bell Mining Co., has been visiting the Portland Canal Mining Division, B. C.

Mr. J. A. McDonald, a well-known northwestern mine operator, is reported to have bonded the Bayview Group, situated on the west side of the Bear River a short distance from the town of Stewart, B. C. The showings thus far are encouraging, some high-grade silver-gold ore having been uncovered.

Mr. A. W. McDonald, Superintendent of the Department of Industrial Relations, Dominion Coal Company, Sydney, attended the recent quarterly meeting of the Executive Committee of the Nova Scotia Accident Prevention Association at Halifax.

Messrs H. C., W. E., and C. W. Magee, brother mine operators interested in the Patricia and Montana Groups of claims on the south fork of the Marmot River, have returned to Stewart after wintering in Vancouver. Dr. R. E. McKechnie, a well-known resident of Vancouver, is one of the principal owners of these properties, which have been optioned to an English syndicate until July 1st. It is said that, if the terms of the agreement are carried out, \$50,000 will be expended on development this season.

Frank E. Lucas, Economy Engineer of British Empire Steel Corporation is in Halifax in connection with the coal and coke business of the Company.

Mr. A. A. Mackay, of Montreal, has left for northwestern Quebec, where he will commence immediately examination of the property of the Lake Fortune Mining Company in Boischatel township.

Mr. F. W. Guernsey, retiring chairman of the British Columbia division of the Canadian Institute of Mining and Metallurgy, was entertained at a complimentary dinner in Vancouver last week. The newly elected officers are as follows: Mr. Thomas Graham, chairman, Mr. H. G. Nichols, vice-chairman for the Coast district; Mr. M. E. Purcell, of Rossland, vice-chairman for the Interior, and Mr. H. Mortimer Lamb, secretary-treasurer.

M. E. G. Germer, who was formerly the owner of the Colonial Mine at Cobalt, which was subsequently taken over by the Contintenal, has been visiting the property.

### IMPROVED STATISTICAL SERVICE ON COAL

The series of monthly reports on coal statistics for Canada issued by the Dominion Bureau of Statistics is now being prepared in printed form which is much more convenient for reference than the stencil copies formerly distributed. Several new features have also been added. In the text, a review of the coal statistics for the month is presented, and in the tables, the output of coal from Canadian mines is shown by districts, the imports from the United States and Great Britain are given by ports of entry and the exports are shown by ports of exit. Data are given for the month and for the year to date with comparative figures showing the average for the month and the period in the three preceding years. One of the new tables shows the tonnage lost in the coal mines of Canada by Provinces and gives an analysis of the percentage lost by causes including absenteeism, lack of orders, car shortage and mine disability.

It is expected that each issue of the *Monthly Report of Coal Statistics* for Canada will be off the press about six weeks after the close of the month reported. Copies of this report may be obtained, free of charge by those interested, on application to the Dominion Bureau of Statistics at Ottawa.

The movement of iron ore down the Lakes this season promises to be unusually rapid, and it is estimated that the season's output from the Lake Superior field for 1923 will exceed 60,000,000 tons.



## AN ADVANCE IN SUBMARINE COAL MINING IN NOVA SCOTIA

About eighteen months ago, No. 9 colliery, operating on a seam directly overlying that of No. 2, one of the largest collieries in Canada, ceased hoisting coal until the workings of the lower seam were advanced to permit of pillar extraction without undue disturbance of the coal measures above. This work of drawing the pillars in No. 2 has just been begun and from a mining engineer's standpoint it is most interesting. Both collieries are under the sea, the lower seam having a cover of twelve hundred feet. As work on the upper seam will not be resumed for six months yet, or exactly two years from the time mining was stopped, a sufficient number of pillars will be drawn before then to induce a large break. As there are 450 feet of strata between the two seams, the subsidence is expected to be of such a nature that the upper seam will be very little affected. All pillars will be swept out clean and whatever settling of the measures takes place should be uniform, which will prevent the forming of "humps" and strata fracture. When the time comes to draw the pillars of the upper seam, these will be removed by the same method and the eight hundred feet of strata remaining between the coal and sea bottom will, while being allowed gradually to subside, be very little disturbed.

To remove a thickness of thirteen feet of coal with a cover of twelve hundred feet under the sea is a very fine mining problem and one on which many eyes will be focused. It will be years, however, before the pillars of the upper seam, which is six feet thick, will be removed; but once begun they too must be taken out clean to allow uniform subsidence. The first work of this kind was done in Princess colliery, Sydney Mines, where all pillars were successfully extracted under Sydney harbour, the coal there being six feet high. The cover is 1,200 feet. This experience has given great confidence to mining in other parts of this under-sea coal bed. There is very little doubt in the minds of mining men that successful drawing of all the pillars will take place. But on the other hand there is always the uncertainty of the unknown and unknowable quantity in mining an under-sea area that haunts the mind long after all coal of pillar sections has been won. What may take place before the whole seam is exhausted, is an ever-present question which no mine manager or mining engineer can afford to ignore. It is not enough to follow methods of mining that will allow the sea bed to settle so that no break will take place through which water might filter and fill the mine. The barrier pillars between collieries must be sufficiently thick to withstand enormous pressure, should such a thing occur as the sea breaking in. Experience in Cape Breton mining has taught that barrier pillars have been left sufficiently strong to resist pressure when large collieries have had to be flooded, but the working of the mine had so affected the overhead strata as to weaken and open them, which allowed large quantities of water to pour through into adjacent collieries. This is a real source of danger, which can only be guarded against by leaving boundary pillars undersea so thick that the overlying measures will not be affected.

If a straight line were drawn between the two points on the shore-line where the two outside shafts are sunk it would measure about twenty miles. In this distance there are now less than fourteen collieries, and five others projected. The coast on this shore-line is deeply indented with bays and harbors, but the collieries are situated as close to the shore, on points jutting out into the sea, as is consistent with safety. From these points of vantage the coal-field is attacked, and as the three subordinate basins formerly known as the Lingan-Victoria, the Sydney Mines and Bras D'Or, and the Glace Bay basins are now known to

unite and form one great undersea basin, it can be readily understood that mining science has here a great problem for experiment. To remove the coal seams lying nearer the sea bottom without endangering the collieries in operation or the coal seams underlying, is a big task; but the mining engineers of Cape Breton are equal to it.

In this they are ably supported by the British Empire Steel Corporation, which when advised of the proper mining policy, stopped one of their largest collieries for a period of two years that this policy might be put into full operation at once. The company that will do this can be trusted to use the methods of mining that will tend to maximum production and minimum loss of coal in the mine, with due regard to the success of the mining industry in the days to come.—J. M.

## DISCOVERY OF \$26,000,000 WORTH OF PLATINUM DREDGING GROUND IN THE URAL MOUNTAINS\*

Before it was impossible to operate in Russia, when it was vitally necessary to obtain adequate quantities of this precious metal for sulphuric acid manufacture, electric contact points and other purposes, every effort was put forth to increase production. Great advance in price was a stimulus to studying peculiarities of occurrence with the object of enlarging reserves and cheapening and hastening production.

Platinum occurs in the Ural Mountains in those small localities where the ultra-basic rocks are exposed. It has not been successfully worked *in situ*, nor are there veins capable of economic exploitation. It is sparsely distributed in the olivine rock associated with chromite. Disintegration of the olivine liberates the fine round grains of platinum through erosion and it finds its way into the beds of the streams which flow off these olivine bosses. A stream flowing over such rock might also contain platinum down stream. Irregularities may be discovered, for in certain instances reconcentration has occurred. Further, since the deposition of platinum, the stream may have changed its course, and it is a problem to determine where the platinum is at this time.

Besides fifteen dredges of construction too light for the purpose most of the work was done by hand. A group of seven or eight men would be allocated a plot of ground 70 x 70 feet. Then they would sink a shaft through the gravel and clay to bedrock, pumping out the water and wherever possible joining their workings with others, should there be a bedrock drainage tunnel. The sandy clay paystreak six inches to one foot above bedrock in favorable localities, contained the platinum richly concentrated, sometimes so that it could be picked up with a spoon. Kytlim river on the Nicolo Pavda estate was such a locality, within a few miles of the divide between Europe and Asia, with 5,000 men so employed, each group washing out its own platinum and turning it over to the company office, at a reduced price, to compensate for facilities furnished, and in some parts for a central washing plant operated by hand. The ground remaining was fast becoming unprofitable. Steep creek grade, old timbers, abundance of clay of the worst kind, and many big boulders seemed to make dredging hazardous.

\*By R. S. Rostford, Member American Institute of Mining and Metallurgical Engineers, Engineer in Charge, "Research" Narrative 57, Engineering Foundation, New York.



The two miles of Kythin river flowed into the Lobva. Many shafts had been sunk in the latter, across the stream bed, with negative results by local operators and by exploring parties from other countries. Apparently not realizing the source of the platinum, previously described, the upper extension had been missed. A series of shafts at sufficiently close equal intervals, at right angles to the probable direction of bedrock flow of the platinum pay streak, disclosed that there had been three streams which had united to produce the deposit. This fact discovered, lines of shafts determined the limits, average value, depth and conditions to be encountered, in exploitation.

The assumption before this discovery was that the much larger Lobva river had brought in so much gravel and had been so swift that much of the platinum had flowed away and had been so diluted as to yield only the traces hitherto found. It was further assumed that the platinum, being heavy, round and easily concentrated when freed from the clay, had not been carried in large quantities far beyond the junction, which their prospecting seemed to confirm.

Lines of shafts extending across the valley, sunk to investigate previous results, only confirmed those results. However, continuing to extend a line of shafts to the bedrock rim, which seemed to be close, at a point beyond other prospecting shafts and below what appeared and is now known to be a bench, the bedrock receded,—and then we came into the platinum a few shafts farther on. It was a glorious feeling, especially as there is fully five miles of it over 750 feet wide tucked in under the bench, averaging from top to bottom over 80 cents per cubic yard at present prices. The upper end was much richer.

We were not quite out of the woods yet, but the stuff was there. Other problems were solved. Four dredges have been operating and two others under construction, three of them modern American dredges, electrically driven from a wood-fired power plant in the forest. The product was about a quarter of a ton of platinum annually, and when all the dredges are in operation, will be about two-thirds of a ton, at a trivial working cost. Shares went from 67 to 450 during this period, and dividends increased continuously.

## PRODUCTION OF LIGNITE IN GERMANY

It is of interest to note that the 1922 production of lignite registers an increase of 57 per cent over that of 1913. This development is due to the necessity of replacing fuel for the lost bituminous coal areas and for the coal applying to the reparation deliveries. Lignite is far from being a satisfactory replace fuel because its heating qualities are only about one-third as great as bituminous coal, and it requires, when briquetted, about 50 per cent more shipping space.

However, it is used with good results for household heating purposes, and also by electrical plants; the glass, porcelain, and textile industries; chemical works, etc. Its greatest economic value lies in its consumption in the vicinity of place of production.—U. S. Commerce Reports.

## LIQUID OXYGEN EXPLOSIVE

Results of an investigation at the Bureau of Mines experiment station, Pittsburgh, Pa., indicate that liquid oxygen explosives may be used to advantage, especially in the lessening of blasting costs, in iron, salt and other mineral mines and quarries. Preliminary tests seem to indicate that liquid oxygen explosives are not suitable for use in gaseous and dusty coal mines, although the experiments offer some hope of so modifying these explosives as to make them suitable for certain uses in such mines.

There are a number of advantages gained by the use of liquid oxygen. One great advantage in using liquid oxygen as compared with dynamite and black blasting powder is the low cost per unit of material blasted. As liquid oxygen explosives are made at the place of consumption, the danger common in the transportation of other explosives is eliminated. In the use of liquid oxygen explosives there is practically no danger of premature ignition. The danger of mis-fires is eliminated by a wait of 30 or 40 minutes after the fuse is lighted, when practically all the oxygen will have evaporated. Another advantage in the use of this novel type of explosive in mining operations is the elimination of the danger of unexploded sticks in shoveling and subsequent handling of ore or coal going out of the mine. Other sources of danger eliminated are handling and thawing processes such as are necessary with frozen dynamite and the hazard from lightning or fire when stored in magazines.

### Disadvantages

The use of liquid oxygen explosives in mining and blasting operation has, however, certain disadvantages. Because of the rapid evaporation, liquid oxygen must be used quickly and within a definite time after the hole is charged, thus limiting the number of shots that can be fired in any one place and making the firing of a group of shots, although possible, more difficult. In this regard, however, it may be said that in one mine using liquid oxygen explosive a round of 28 holes was blasted at one time. The use of liquid oxygen explosives virtually requires the installation of a local liquid oxygen plant involving a considerable first cost. This liquefying plant must be kept running regularly, if liquid oxygen is to be obtained at low cost, as the main cost of making liquid oxygen is in the power used. The arranging of practical methods of use of liquid oxygen explosives in an ordinary mine or quarry is difficult because the miners or quarrymen have been accustomed to using dynamite or black powder.

The chief item in the cost of liquid oxygen explosives being the cost of the oxygen, the Bureau of Mines considers that there is hope of a decided reduction in cost through improvement in liquefying machines.

### Rising Cost of Nitrate Explosives

The gradual increase in the cost of producing standard explosives and the resultant increase in the saving possible through the use of liquid oxygen explosives, the Bureau of Mines considers will tend to overcome the natural opposition of miners and quarrymen who have always used other explosives.

Under the stress of necessity of providing nitrates for military explosives, the development in Germany, after the beginning of the war, was rapid. Liquid oxygen explosive was used in large quantities in the Upper Silesian coal mines, which were non-gaseous, in tunnel work, in subway and excavation work in cities, in iron mining — not only in Germany, but also the French iron mines of Lorraine which had been seized by Germany — and also for destroying French steel plants.



French officials in the Briey iron district believed that the explosive introduced by the Germans had come to stay.

An investigation in September, 1920, by George S. Rice, chief mining engineer of the Bureau of Mines, disclosed that there were in operation 136 liquid oxygen plants at coal, iron potash, and salt mines throughout Germany, having a total capacity of 3,797 liters of liquid oxygen per hour. Allowing for losses, and calculating the time operated; a net total of 2,430,000 liters or 5,346,000 pounds, of oxygen was used, equal to 8,000,000 pounds of dynamite.

#### Portable Plants

One of the most interesting features of the development had been the design and construction of small portable liquid oxygen making plants of a capacity of only 3 to 5 liters of liquid oxygen per hour. Such plants have been constructed for moving about on trucks, thus making liquid oxygen much more available for small operators.

A further important development in the use of liquid oxygen explosives in Germany has been made through the pre-arrangement of a shot-firing circuit, by means of which, it is claimed, as many as 28 shots have been fired in a round.

Under present conditions in the United States introduction of the explosive will have to depend on demonstrated merits and advantages in comparison with explosives already in use.

Experiments on liquid oxygen as an explosive began at the Bureau of Mines testing station at Pittsburgh, Pa., in April, 1917. An appropriation of \$15,000 for investigations of this nature during the coming fiscal year has been made by Congress. The results of experiments so far made are summarized in Technical Paper 294, which may be obtained from the Department

#### LARGE GOLD NUGGETS FROM SMALL VEINS

In a rugged out-of-the-way region on the ocean side of the Coast Ranges, in Monterey County, California, gold nuggets have been found of such size as to suggest that this was once a favorite retreat of the proverbial goose that laid the golden eggs. Matter-of-fact prospectors, however, have sought to find the veins from which such masses of gold, loosened by the weather, were washed into the stream beds. Their search has not been successful, and J. M. Hill, a United States geologist of the Department of the Interior, in a report just published suggests that the nuggets came from rich superficial pockets in very small veins, and that no large and rich deposits are likely to be found by deep mining. The Coast Ranges of California, unlike the Sierra Nevada, are not rich in gold, and the occurrence of these large nuggets is exceptional and illustrates the fact, known to many prospectors, that the discovery of a few large nuggets does not necessarily indicate the existence of a rich deposit of gold ore in place.

The Jardine Mining Company in Montana, has commenced to treat low-grade gold ore containing arsenic, consequent upon the present high price of arsenic. This event directs attention to the gold-arsenic ore of Hastings county, Ontario, which have remained unworked for many years, though formerly profitable. There is no intimation as yet that the owners of these deposits consider them workable at present.

#### BOOK REVIEW

MERCURY ORES, by Edward Halse. Monograph of the Imperial Institute, published by John Murray, 50-A Albermarle Street; London; W. I.—100 pages—price 5 s. net.

This volume is one of the Imperial Institute's series on mineral resources, and deals particularly with occurrences within the British Empire, while mentioning more briefly deposits in foreign countries. The geological association of mercury ores with igneous intrusion and hot springs is noted as universal, the ore being found mainly in sedimentary rocks near an intrusion.

Canada's only mercury deposits so far discovered are near Kamloops Lake, B. C., in a zone 30 miles long and 2 miles wide. Some ore carrying 0.75% mercury has been mined, but it is of too low a grade to be worked at present.

New Zealand is the only part of the Empire in which there is at present active mining of mercury ore. At Puhupuhi in the North Island there has been determined 60,000 tons of ore averaging over 1% mercury, and there is some expectation that a million tons of ore can be won by open-cut mining. An experimental reduction plant is being erected.

The principal mercury mines of the world are in the Idria and Monte Amiata districts of Italy (formerly in Austria), at Almaden in Spain, and in California. The Italian mines are operated by the government. The Idria deposits were discovered in 1470 and have been worked ever since. The ore occurs in fissures in a bed of Triassic shale, up to 66 feet in thickness, with 0.75 to 1% mercury. The ore producing zone of Monte Amiata covers 150 square miles, within which are numerous small mines with ore carrying up to 1% mercury.

The Almaden mine in Spain has been worked for centuries, and supplies nearly one-third the world's annual need. It is now worked to a depth of 1300 feet, in ore of increasing richness, impregnating bands of slate and quartzite of Silurian and Devonian ages. The ore is of high grade, said to average 8%, and the present annual production is estimated at 1000 tons of mercury.

There are numerous small known deposits of mercury ore in Mexico, which are worked periodically. The same can be said of the United States, where the low tenor of the ore in most of the mines (averaging about 0.5% mercury) allows of activity mainly during periods of high prices.

This volume almost duplicates that recently issued by the Imperial Mineral Resources Bureau. Might it not be better, in future, to concentrate effort on a single volume.

Production of by-product coke in the United States in March reached the unprecedented total of 3,256,000 net tons, which was 16 per cent greater than the February output, and 5 per cent more than production in January. The estimated present capacity of by-product ovens is 3,725,000 tons per month of 31 days. Thus the output indicates production at the rate of 87.4 per cent of total capacity and an average of 105,042 tons per day, which is an increase of 4,692 tons or 4.7 per cent over the daily rate of production in February. Of the 71 plants in existence 64 were active and 7 idle.



## PETROLEUM AND GAS IN ONTARIO

"Natural Gas in 1921" and "Petroleum in 1921," by R. B. Harkness, Commissioner of Natural Gas, are contained in the 80 page report comprising Vol. 31, Part 5 (1922) of the Ontario Department of Mines report. The 71 pages devoted to natural gas demonstrate the wisdom and utility of creating the office of Commissioner, which was, to a large extent, forced upon an unwilling public by the alarming diminution of natural gas supply in the gas fields of Southwestern Ontario. The production during 1921 was 8,532 million cubic feet.

The Commissioner of Natural Gas is a true conservationist. By means of legal regulations, as well as by educative propaganda and research, he is gradually putting to the most effective use the remaining supply of natural gas. This is illustrated in his report by certain practical instructions in the effective use of gas; by the prohibition of free gas supply, which inevitably entails waste; and by the compulsory adoption of proper metering devices. A systematic record of results from wells drilled in Ontario is a useful feature of the report.

In order to obtain an impartial judgment on the various conflicting claims that arose after the appointment of the Commissioner, a consulting engineer of note, Mr. Samuel S. Wyer, of Columbus, Ohio, was engaged to examine the gas field in Kent County, the principal one in Ontario. His report, quoted in full by the Commissioner, commends the practical measures for conservation already adopted and suggests further measures.

The brief report on the oil fields shows a production for 1921 of 172,858 barrels, thus marking the gradual decline. A map marking the oil pools, past and present, of Southwestern Ontario is included.

## DIAMONDS FROM ARKANSAS

Nearly 6,000 diamonds have been found in diamond mines in Arkansas, and some stones have been picked up in other States. The diamond fields of Arkansas are in Scott County, where a valuable diamond was first found in 1906 by John Huddleston, a farmer. The mule he was riding happened to kick up a stone of unusual brilliance, which caught his eye. He dismounted, picked up the stone and put it in his pocket, and a few days later the performance was repeated. The stones were sent to Tiffany of New York, whose expert said "diamonds," and soon afterward Mr. Huddleston is said to have sold his 40-acre farm for \$36,000.

Though the diamond field of Arkansas has never achieved greatness, it has yielded a considerable number of fine stones, the largest weighing  $21\frac{1}{4}$  carats and another stone weighing 17.86 carats. Many of the Arkansas stones are as fine as any found elsewhere and, according to George F. Kunz of Tiffany's, they include a large proportion of white stones, most of them of high grade in color and brilliancy and freedom from flaws. Doctor Kunz further states, in describing several of the yellow, brown, and white stones from Arkansas, that "these are absolutely perfect and are equal to the finest stones found at the Jagersfontein mine or that were ever found in India."

A few of the Arkansas diamonds, it is said, have sold for as high as \$600 a carat. Most of them, however, are small and have been placed in private and museum collections. Diamonds do not occur in clusters, nor

are they gathered together in the volcanic "pipes" or mother lodes in which they are found. The average recovery in the African diamond mines is about one carat to two tons of ore, and the average recovery in the Arkansas mines has been about one carat to eight tons of ore.

## COKING OF OIL SHALES.

Results of all past assay retort studies in the oil shale laboratory of the Department of the Interior at Boulder, Colorado, have been tabulated and will serve as the basis for a report to be prepared by engineers of the Bureau of Mines. In connection with this work, some very interesting information regarding the coking of different shales has been accumulated. The sample of Australian shale which yields over 120 gallons of oil to the ton has only a slight tendency to coke in the retort. The 60-gallon Elko, Nevada, shale has no tendency to coke. The 65-gallon massive shale from DeBeque, Colorado, shrinks to half its size and apparently melts down in the retorting process, and the resultant coke adheres most tenaciously to the retort walls, being difficult to remove. Another massive shale from the same locality, but 600 to 700 feet higher in the series, yielding about 60 gallons of oil to the ton, shows only a slight tendency to coke. The 50-gallon Soldier Summit shale has no tendency to coke, and the 34-gallon standard DeBeque shale shows only a slight tendency to coke. It is thus apparent that the richness of the shale is no indicator of its coking tendency. An interesting problem opened up here is to determine if possible what characteristics of the shale indicate tendency to coke and measures may be taken to prevent coking. The particular DeBeque shale that cokes so badly seemingly represents the richest workable deposit in that district, so the solution of this problem is likely to have results of great importance.

Analytical distillations were made on the shale oil produced by the assay retorts from the Australian shale and on the oil produced by running to coke Australian shale produced by a commercial plant. The results are exactly parallel to results of similar studies on American and Scotch oils.

## INDUSTRIAL ITEMS

"Jackhammer" drills are described comprehensively in the 32-page bulletin, No. 4046C, just issued by the Canadian Ingersoll-Rand Company. This bulletin is a second edition, revised. It describes both dry and wet patterns, hand and mounted types, and is fully illustrated. It can be had on request by those interested.

"I See a Coal Mine," is the title of a little story of coal, from pit to boiler, told briefly by Walker Enright in a tiny volume issued by the Taylor Stoker Co., Ltd., Toronto and Montreal. The moral of the story is, of course, that Taylor Stokers, with their continuous, automatic feeding of fuel to the boilers, make better use of the coal than other means of firing.

Jos. W. Hays, consulting engineer of Michigan City, Indiana, who has up to the present conducted his practice with the aid of a corps of assistants, has now organized Jos. W. Hays and Associates, who will carry on the work under the firm name. The firm's speciality will continue to be steam plants.

# THE MINING DISTRICTS

BY THE JOURNAL'S CORRESPONDENTS.

## NORTHERN ONTARIO

**Quinze Power.** — The firm of Beatty & Morrow Limited, have secured the contract for the construction of the 20,000 h.p. hydro-electric installation on the Quinze. Power from this installation, which is expected to be available before the end of 1924, will be used very largely for the Porcupine mines. Contractors have already started work, and the surveys of the transmission line are under way.

**Strike Vote.** — It came as rather a surprise to learn that the Porcupine Miners' Union had decided to take a strike vote. Voting started on May 17th and will be continued until the 20th. It is understood that so far the response of the miners has been very small and that comparatively few votes have been cast.

**Cobalt.** — The report of the Nipissing for April shows that the company mined ore of an estimated value of \$192,987, and shipped bullion of an estimated value of \$204,485. The low-grade mill treated 6,858 tons and the high-grade plant 202 tons. The refinery shipped 304,178 ounces of bullion, which is estimated at 67-3/8c. per ounce. The most important development during the month was the extension of veins No. 251 and No. 304, which showed substantial improvement as stoping progressed.

La Rose has completed its crosscut into the old Violet workings at a depth of 630 feet in the new shaft. Where the vein was encountered it showed from 4 to 8 inches of high-grade ore, with good values in the mill rock. The company has made arrangements to have its ore milled by the Mining Corporation, and shipments will be commenced in a few days.

**South Lorrain.** — A good deal of disappointment is felt over the condition of the South Lorrain road, which is in an almost hopeless state. The Government has spent a lot of money on this road and no doubt feels that it has met the desires of the operators; but unfortunately for the latter, while a good deal of money has been spent most of it has been spent where it would do the least good. Last year work was confined very largely to the part of the road that needed it least so that this spring teams were unable to get through with loads.

**Kirkland.** — The Tonopah Mining Company has started work on the King-Kirkland, Wood-Kirkland and Moffat-Hall. On the King-Kirkland development work is being undertaken on the 400-foot level, and it is understood that the shaft will be continued to 1,000 feet. On the other two properties the work for some time will be confined to the surface.

Teck-Hughes expects to start crosscutting on the 1,100-foot level within a few days, and will open up the 9th and 10th levels. Development in all parts of the mine has been very satisfactory and the grade is the highest of any gold mine in Northern Ontario. Production in April was approximately \$88,000.

Machinery for the new mill of the Lake Shore is beginning to arrive on the ground, and practically

the entire plant is on order. Construction work is already started, and it is expected to have the new mill in operation before the end of the year.

Kirkland Lake Proprietary, which has undertaken a big development campaign in Kirkland, has also taken an interest in the Moneta property in Porcupine. A recent report of Mr. H. S. Denny speaks very encouragingly of the possibilities in Kirkland. The shaft is being sunk to 800 feet, and the company is now amply financed to carry it to the point where production can again be started.

Preparations are being made to sink on the Town site property, which has been taken over by Mr. A. D. Miles, representing John Taylor & Sons of London, England. The same company has taken an option on the Queen-Lebel property and will continue the shaft from 60 to 300 feet, where lateral work will be undertaken.

The Continental will instal an electrically driven plant on its Kirkland properties. The shaft has been sunk to a depth of 150 feet by hand, and some encouraging values have been encountered.

**Porcupine.** — Work has been resumed on the Clifton property in Porcupine, sufficient funds having been raised by the underwriting of 250,000 shares of treasury stock at 30 cents a share. The company proposes to continue its development programme.

The Goldale has started work on the sinking of its shaft from 650 to 1,000 feet. During the sinking no work will be done on the 500-foot level. The Company found two good shoots of ore on the 500-foot level and it is hoped that there will be an improvement at 1,000 feet.

The Coniagas is also preparing to sink a new shaft on the Newray and it is stated that this may go to 1,000 feet.

The power shortage of this spring is reflected in the April output of the Dome, which amounted to \$160,111 as compared with \$260,000 in March and \$366,000 in February.

The Dome Lake is now receiving electric power and has commenced the unwatering of the mine. The shaft is to be continued from 600 to 1,000 feet, and four new levels will be opened up.

It is learned that the McIntyre is considering the sinking of a new shaft which will reach an ultimate depth of 5,000 feet, and that the company is also considering the building of a new mill on the north side of Pearl Lake. With depth the company is getting the downward extension of an increasing number of Hollinger veins, and on the McIntyre they appear to be of higher grade than on the Hollinger. An official of the company has stated that within a few years the McIntyre should be able to equal the Hollinger output. The present mill is now treating 1,000 tons a day, and the grade of ore is higher than when a smaller tonnage was being treated.



**Ontario Companies in Quebec.** — Several of the Northern Ontario mining companies are arranging to start work in Ronny township in Northwestern Quebec. The Dome has a large acreage under option, which will be investigated this summer. La Rose has recently taken options on approximately 500 acres of ground a short distance south of the Noranda properties, while still further South the Coniagas has several claims. The Lyman-Quebec syndicate has sent in a gang to carry on prospecting work, while a number of other syndicates and companies are preparing to operate. The extension of the Powell vein is reported to have been found half a mile further south, and several new discoveries in other parts of the camp are reported. The district appears to be important and this summer's work should go a long way toward proving it.

### BRITISH COLUMBIA

**Stewart.** — Work on the upper levels of the Fish Creek Mine, American Mining & Milling Co., has ceased and the compressor and other plant is being moved to facilitate the driving of a long crosscut tunnel with a view to locating the veins at depth. This, it is reported, is in line with the recommendation of G. T. Jackson, mining engineer, who examined the property, in company with W. R. Tonkin, last year.

**The Copper Bounty.** — News of the Dominion Government's bounty of 1½ cents per pound on bars and rods manufactured from Canadian copper for use in Canada is enthusiastically received in British Columbia. S. G. Blaylock, general manager of the Consolidated Mining & Smelting Co., is quoted as stating that it is a step in the right direction, as has been proven by the inactivity of the \$200,000 copper plant of the Trail smelter. The placing of oxide of antimony, one of the newest products of Trail, on the same basis as zinc, may lead, it is said, to its production as white antimony instead of in metallic form as at present.

Noble Binns, president of the Associated Boards of Trade of Eastern British Columbia, and F. A. Starkey, Commissioner for the same Association, are extremely pleased and are quoted as stating that, if the tariff changes work out as would appear likely from first indications, the copper mining industry of the province will be greatly stimulated.

**Trail Ore Receipts.** — Ore receipts at the Trail smelter, Consolidated Mining & Smelting Co., for the last week of April, totalled 11,290 tons made up as follows:

| Company                                | Tonnage. |
|----------------------------------------|----------|
| Black Rock, Northport . . . . .        | 152      |
| Bosun, Silverton . . . . .             | 34       |
| Company Mines . . . . .                | 10,235   |
| Lone Pine, Republic, Wn. . . . .       | 223      |
| Quilp, Republic, Wn. . . . .           | 162      |
| Rosebery Surprise, New Denver. . . . . | 52       |
| Silversmith, Sandon . . . . .          | 328      |
| Surprise, Republic, Wn. . . . .        | 104      |

11,290

During the first week in May there were received at Trail 11,519 tons, the details of which follow:

| Company                                              | Tonnage. |
|------------------------------------------------------|----------|
| Black Rock, Northport, Wn. . . . .                   | 40       |
| Bell, Beaverdell . . . . .                           | 47       |
| Howitt, Silverton . . . . .                          | 41       |
| Knob Hill, Republic, Wn. . . . .                     | 211      |
| Lone Pine-Surprise-Last Chance, Republic Wn. . . . . | 441      |
| Quilp, Republic, Wn. . . . .                         | 213      |
| Surprise, Republic, Wn. . . . .                      | 51       |
| Silversmith, Sandon . . . . .                        | 221      |
| Standard, Silverton . . . . .                        | 172      |
| Company Mines . . . . .                              | 10,082   |
|                                                      | 11,519   |

**Canada Copper.** — T. H. Marshall, of New York, was the purchaser of the entire assets of the Canada Copper Corporation which are centred chiefly in the Province of British Columbia and the State of Washington. They were put up at auction in the Court House of Vancouver City on May 7th and Mr. Marshall's bid of \$2,000,000, the only one received, was accepted. A cash payment of \$10,000 was made and part of the \$2,500,000 bonds, the default of interest on which led to foreclosure proceedings, will be used for the purpose of the purchase. The amount due on the bonds inclusive of interest was given as totalling \$2,926,780. Mr. Marshall is understood to represent Messrs Hayden Stone & Co. of New York, and it is understood that these formalities are preliminary to the assumption of control of the mine and plant at Copper Mountain and Allenby, B. C. by the Granby Consolidated Mining & Smelting Co.

**Slocan Relics.** — A rifle and old-time prospector's pick, used by Eli Carpenter, the discoverer of the Slocan, have been presented to the Associated Boards of Trade of Eastern B. C. for display at the City of Nelson with other souvenirs of historic interest.

**Ainsworth.** — The Cork-Province mine and mill have resumed operation. Work on the 400-foot level is proceeding in both directions on the hanging wall side of the vein. General underground conditions are reported as excellent and it is expected that production will be under way in the course of a few weeks.

**Lardeau.** — W. B. Smith, of Spokane, and I. N. Eirnhart, of the Federal Silver Mining Co., Troy, Montana, are reported to have taken a bond and lease on four crown-granted mineral claims twelve miles from the head of Kootenay Lake in the Lardeau District. The agreement calls for the payment of \$45,000 within five years. Development is to start immediately. Mr. Smith says that a very wide vein is in sight within which on the footwall there is an 18-inch stringer of high-grade grey copper ore in white quartz.

**Slocan.** — Judgment for \$10,000 in favor of the Canadian Bank of Commerce against the Lucky Jim Zinc Mine has been granted by the Supreme Court of Canada. For the Company it was stated that the debt probably would be paid and the defendants were allowed six weeks to do so.

**Cariboo.** — Further rich placer ground is reported to have been found near Quesnel Lake, and about three miles from Cedar Creek, Cariboo District.



**Taxation Ruling.**—Two important rulings have been made by the Taxation Department of the Minister of Finance of British Columbia with reference to the assessment of the mining industry. It is declared that a mill treating customs ore only is exempt from taxation on the land; and that a mill treating ore from its own mine, even if it is treating customs ore in addition, is exempt.

## NOVA SCOTIA

**Troubles of the "Reds".**—The "Reds" are on the run and revolution no longer hangs threatening over the heads of the mining villages of Cape Breton. The foot race began with Malcolm Bruce, who for seditious utterances had to leave Glace Bay rather hurriedly. A wise man once said that "the wicked fleeth when no man pursueth," and Sam Jones said, "Yes, but he runs faster when chased."

The chasing and running business was not, however, confined to Bruce of Toronto. Bell, another Toronto importation who replaced Editor Cotton on the *Labor Herald*, to please his small coterie of friends made a strong personal attack on Silby Barrett, International Board Member of the U. M. W. of A. Barrett resented it and appeared in the office of the *Labor Herald*. Bell at first grabbed a part of the office stove, but thought better of it and "beat it." Now Barrett says men who talk revolution should not be afraid of a black eye.

A night or two later the mounted constables of Nova Scotia entered the headquarters of the U. M. W. at Glace Bay and searched it for seditious literature, and carried away the Red flag of the May Day demonstration. The home of J. B. McLachlan was also searched for seditious literature. Some Sydney houses were entered where it was known that Soviet literature was kept and bundles of it were seized and sent to the Attorney General's office in Halifax. These bundles contained printed propaganda and pamphlets in the Russian and other foreign languages. A general clean-up is to be made and from this on no privileges will be granted workmen who are out to violate the laws of the country that protect and shelter them.

This action has had a decided effect on the residents of the Sydney and Glace Bay districts, and sober thought is returning to men who without reflection permitted themselves to be carried away by the wild words of worthless men. The "Bulls of Bashan" no longer bellow, and the sublime secretary, J. B. McLachlan, of District 26, U. M. W. of A., whose word yesterday "stood against the world," today finds "none so poor as do him reverence." The mining villages laugh and wonder "how the mighty have fallen;" but mourners do not go about the streets.

Nova Scotia has had great patience with the "Red" agitators, but when the religious and national feelings of its citizens were outraged by real Russian Reds and others of the same type and the "Key Industries" of the Province were threatened with disaster the Government rose to the occasion and is now in action. "Run them out of the Province," is the common cry, and there is much meaning behind it. It was fast reaching the point where the moderate, tolerant citizen was beginning to realize that for him there was just

one of two things to do, either to quietly leave his native Province or gird himself and assert his right to enjoy the liberty and peace the British flag offers. The first was beneath the thought of a red blooded Nova Scotian, so the issue was joined and consternation suddenly smote the Red camp. It is hard to say which was the more surprised at the sudden change in affairs, the peace loving citizen or the boasting blackguard paid to spread discord and create unrest.

**Steel Plant Busy.**—The Sydney Steel Plant is running full blast, with all departments in operation. The blast furnaces made new records last month, and are in a fair way to beat these this month. The bulk of the steel output, is going into rails, wire products, and material for the order for one thousand cars on which the Eastern Car Works at New Glasgow is now working. The billets for this work are reduced in size so that the machinery of the New Glasgow plant can easily handle them.

Newfoundland labor is finding the Sydney Steel Plant a very favorable source of employment, as upwards of one hundred men from the Colony were placed in one day recently.

**Housing Scheme.**—The British Empire Property Company has been formed for the purpose of selling the houses owned by the British Empire Steel Corporation to their employees. The business agent is Thomas Cooke, Sydney Mines. The aim of the Company is to help the workmen of the coal and steel industries of Sydney and the colliery districts to secure their own homes. This will lead to a settled and contented class of workmen with an interest in the villages in which they live, and a feeling of responsibility that rests upon all good citizens with high ideals. It will, so far as the companies are concerned, reduce the labor turnover, develop a professional class of workmen who will find their trade profitable, tend to lessen labor agitation, and generally bring about desirable social and industrial conditions at the collieries and the steel plants.

The houses are to be sold on easy payments, and workmen will be encouraged and helped to purchase and possess their own homes. On all houses costing \$1,000 or under a 10 per cent deposit will be made, and the rentals rated to have the building paid off at the end of ten years. Where it is found that workmen desire to pay larger monthly rentals they will be permitted to do so, and in this case the first deposit may be less than 10 per cent. An elastic system may be developed with experience, and it is thought that this will tend to show workingmen that there is a strong desire on the part of the steel and coal companies to aid them to be home builders, enjoying all the benefits to be derived from owning a home. Later on the system may be extended and workingmen may find, after all, that there is a common interest that unites the employer and employee of any industry.

Some years ago the Dominion Coal Company decided to sell its houses and made a fair beginning. A few miners bought, but the business was not placed in the hands of a competent business man who would push it and the scheme fell through. The success of the present policy is already almost assured, for houses have passed over to workingmen in every mining village and applications are being sent in daily. Mr. Cooke is an enthusiast, with wide powers and a large knowledge of working men. There is little doubt that he will succeed and that eventually a great change will be brought about in the status of the working men and their attitude to their employers.



**Co-operative Store.**—About the same time that the Dominion Coal Company commenced to sell their houses, the Nova Scotia Steel Company at Sydney Mines adopted the same policy, but with better success. They succeeded in interesting their workmen, with the result that a large number of them now own their own homes. The company benefited by a fairly well contented class of workmen, who set about trying further to improve their conditions. They established or rather built up, a co-operative store business, which is one of the great successes of the Province in that line. Last year's turnover amounted to \$756,000, the dividends on purchases averaging 12 per cent. The building and stock are free of debt. After many fruitless attempts to operate co-operative stores in the Glace Bay district, Sydney Mines Co-operative Society took over the Glace Bay store and in a few years has more than trebled the business. No greater asset can be added to an industrial village than a class of workmen who are trained to understand business, and this training is most thorough in a well organized and well conducted co-operative store business. The Nova Scotia Steel Company have profited greatly by their venture in helping their workmen to their own houses, and there is no doubt that the Dominion Coal and Steel Companies will now have the same reward.

**Mr. Marsh Resigns.**—Karl H. Marsh, Chief Engineer of the Dominion Iron, Steel & Coal Co., and the Nova Scotia Steel & Coal Co., will sever his connection with these Companies on the last of May to take up work in his home land, the United States. Mr. Marsh has made a host of friends since coming to Cape Breton and it is with deep regret that these bid him good-bye.

Although only 38 years of age, he has had a wide and varied experience since leaving college. Since coming to Cape Breton, he has had to do with nearly all classes of construction at the Sydney steel plant, the Wabana iron mines, Newfoundland, at the collieries, the shipping piers and the Sydney & Louisburg Railway. After graduating from the State College of Pennsylvania in 1909, Mr. Marsh went immediately into active engineering with A. G. McKee, Consulting Engineers, Cleveland, Ohio. The following year he went with the Republic Iron & Steel Co., Youngstown, Ohio. For a year he was engaged with the Dominion Iron & Steel Co., Sydney, and then returned to Cleveland, and spent a year with the Cromwell Engineering Co., consulting engineers. The next five years were spent as Superintendent of Construction with the A. G. McKee Co., and then he spent one year as Chief Engineer of the Hamilton Furnace Co., Hamilton, Ohio.

For the past three years, Mr. Marsh has been Chief Engineer in Sydney.

### PLATING WITH CHROMIUM

At the recent meeting of the American Electrochemical Society in New York, Mr. F. C. Kelley of the General Electric Co. described a method of applying a protective coating of chromium to iron and steel. The object to be plated is packed in a powdered mixture of alumina and chromium the latter being at least 95 per cent pure. This mixture contains 55 per cent of chromium, the 45 per cent of alumina acting merely as a diluent, to prevent an excess of chromium adhering to the iron at the high temperature (1300 to 1400 degrees, C.) to which it is heated. The chromium is plated on the iron only in an atmosphere of hydrogen.

### SASKATCHEWAN MINERALS

The province of Saskatchewan is not yet of great importance as a producer of mineral wealth, apart from its lignite mines; but it has distinct possibilities, and one of these, a ceramic industry, has already been inaugurated successfully. The Province has no mines department as yet, so that Bureau of Labour and Industries records, in its annual publication, the chief facts about mineral production. The second Annual Report, covering the period ending April 30th, 1922, was published recently, and from it the following information is extracted.

#### High-Grade Clay Deposits

Saskatchewan is well provided with an abundance of clays for the production of a wide variety of clay wares. The more general types that have been investigated or are in use at the present time are pottery clays, (several grades), stoneware clays, fire clays, shales, ordinary clays. The adaptability of these clays for the manufacture of stoneware, earthen cooking ware and sewer pipe is beyond question, as proven by its prolonged use in the manufacture of these lines at Medicine Hat during the past eight years.

The Ceramic Department of the University of Saskatchewan has conducted tests on clay from two promising localities. A stoneware clay from Knollys, of a grey-white colour, has qualities in working and burning that compare with the best. Ball clay from a deposit near Willows station on the C. P. R. gave similarly good tests, after washing to remove concretionary iron.

#### Sodium Sulphate

The pulp and paper industry of Canada require some 40,000 tons annually of sodium sulphate. This chemical is contained in abundance in numerous deposits in Saskatchewan, and several companies are now producing it commercially. Only those deposits that contain the mineral almost pure, say 96 to 98 percent, and are close to existing railways can hope to produce in competition with the artificially made chemical. Drying of the mineral before shipment is a pre-requisite to success.

#### The pre-Cambrian Area

The northern third of Saskatchewan lies within the pre-Cambrian "shield," notable for its production of metallic mineral wealth. No railway touches this area, and it is in the main unexplored. During the seasons of 1920 and 1921 a provincial party explored the region around Lac La Ronge, on the southern border of the pre-Cambrian area. Few, if any, prospectors have worked in this region, apart from those in the Amisk Lake area near the Manitoba boundary, where the discovery of the Flin-Flon and Mandy deposits in Manitoba stimulated some activity. The canoe routes are good, and large areas of unprospected ground are thus made accessible for exploration.

### FERRO-SILICON IN BLASTING EXPLOSIVES

Occasional use has been made of ferro-silicon in the manufacture of blasting explosives during the past few years, states the United States Bureau of Mines in Bulletin 219. It is added as a sensitizer and also serves to increase the specific gravity of the powder.

Ferro-silicon is an alloy of silicon and iron of indefinite composition and properties, the proportion of the two components varying widely. It is invariably crystalline in structure, though distinct crystallization is absent in alloys containing 50 percent or over of silicon. The exact number of distinct silicon-iron compounds is in



dispute, the number mentioned ranging from two to five.

Impurities in ferro-silicon are largely a function of impurities present in the raw materials from which it is manufactured. It is made commercially either in the blast furnace or the higher-temperature electric furnace. That prepared by the first method contains 20 percent or less of silicon, the richer alloys being made by the second method. In the blast-furnace method the charge consists of iron oxide, siliceous iron ore, and coke, the reduction being effected by the carbon. In the electric-furnace method two kinds of charges may be used. These may be either wrought iron, steel, or cast-iron turnings, quartz, or sand, and charcoal: coke, or coal; or a charge of siliceous iron ore, quartz, or sand, and charcoal. Iron turnings are generally preferable to iron ores.

### SALES OF CRUDE FELDSPAR IN THE UNITED STATES

Reports made by producers of crude feldspar in the United States in 1922 to the Department of the Interior, through the Geological Survey, show sales amounting to 114,200 long tons, valued at \$812,400, an increase of 24 per cent in quantity over the sales in 1921.

The average price was \$7.11 a long ton. In Maine feldspar averaged 10.06 a long ton, in New Hampshire \$8.33, and in North Carolina \$5.77.

"CANADIAN MINING ENGINEER, holding responsible position in United States, desires opening in Canada. Thoroughly familiar with all details of mine development and successful record in mine operation. Must give present employers reasonable notice. Reply; Box 583, Canadian Mining Journal, Gardenvale, Que."



### PURCHASE OF GOLD ORES

The attention of prospectors and others is drawn to the provision in the Mining Act of Ontario authorizing the Department of Mines to purchase parcels of gold ore taken out by prospectors and others in developing or working mining claims. Arrangements have been made by which such parcels of gold ore, whether large or small, will be accepted by the Temiskaming Testing Laboratories at Cobalt, and paid for according to the schedule provided for the purpose. The Laboratories are operated under the auspices of the Department of Mines.

This offers a first class opportunity for testing the value of ores on a large scale, and also of turning ore of good quality into money for carrying on further development work. By special arrangements, on less than carload lots, freight rates on the T. & N. O. Railway are reduced 50 per cent.

The Laboratories are also equipped for working out the best methods of treatment for gold or silver ores of a refractory or unusual character.

Full information as to treatment charges, schedule of payments, etc., can be obtained from the undersigned, or from A. A. Cole, Manager, Temiskaming Testing Laboratories, Cobalt, Ontario.

THOS. W. GIBSON,  
Deputy Minister of Mines.

Toronto, 12th March, 1923

"Assay supplies of all kinds for field and mine use. Send us an estimate of your requirements and we will attach prices. Special "sheet iron gold washing pans, postpaid to any address, \$1.00."

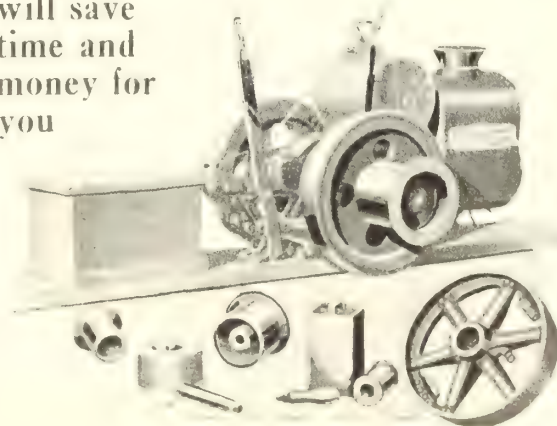
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LINDSAY ONTARIO



# CANADA

## DEPARTMENT OF MINES

HON. CHARLES STEWART, *Minister*

CHARLES CAMSELL, *Deputy Minister*

### MINES BRANCH

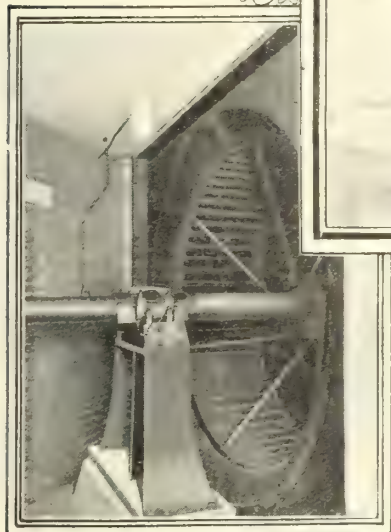
#### Recent Publications

- Phosphate in Canada, by H. S. Spence.  
The Preparation, Transportation and Combustion of Powdered Coal, by John Blizard.
- Road Materials along the St. Lawrence River, from Quebec Boundary to Cardinal, Ont., by R. H. Picher.
- Building and Ornamental Stones of Canada (British Columbia.) Vol. V., by W. A. Parks, Ph. D.
- Barium and Strontium in Canada, by H. S. Spence.  
The Coalfields and Coal Industry of Eastern Canada, by F. W. Gray.
- The Value of Peat Fuel for the Generation of Steam, by J. Blizard, B. Sc.
- Analyses of Canadian Fuels. Parts I to V, by E. Stansfield M. Sc., and J. H. H. Nicolls, M. Sc.
- Graphite by H. S. Spence.
- Gas Producer Trials with Alberta Coals, by J. Blizard and E. S. Malloch.
- Summary Report of the Mines Branch, 1920.  
The Mines Branch maintains the following laboratories in which investigations are made with a view to assisting in the development of the general mining industry of Canada.
- Fuel Testing Laboratory.**—Testing value of Canadian fuels for steam raising and production of power gas; analyses, and other chemical and physical examinations of solid, liquid and gaseous fuels are also made.
- Ore-Dressing Laboratory.**—Testing of Canadian ores and minerals, to ascertain most economical methods of treatment.
- Chemical Laboratory.**—Analysing and assaying of all mineral substances and their manufactured products. Copies of schedules of fees, which are slightly in excess of those charged by private practitioners, may be had on application.
- Ceramic Laboratory.**—Equipment is such that complete physical tests on clays and shales of the Dominion can be made, to determine their value from an economic standpoint.
- Structural Materials Laboratory.**—Experimental work on sands, cements and limes is also undertaken.
- Applications for reports and particulars** relative to having investigations made in the several laboratories should be addressed to **The Director, Mines Branch, Department of Mines, Ottawa.**
- Summary Report.** The annual Summary Report of the Geological Survey is now printed in parts. Applicants should, therefore, state what particular geologist report is required, or what subject they are interested in.
- Memoir 108.** The Mackenzie River Basin, by Charles Camsell and Wyatt Malcolm.

### GEOLOGICAL SURVEY

#### Recent Publications

- Memoir 119.** The Reed-Wekusko Map-Area, Northern Manitoba, by F. J. Alcock.
- Memoir 121.** The Malagash Salt Deposit, Cumberland County, N. S., by A. O. Hayes.
- Memoir 123.** Sixtymile and Ladue Rivers Area, Yukon, by W. E. Cockfield.
- Memoir 125.** Sedimentation of the Fraser River data, by W. A. Johnston.
- Memoir 127.** Beauceville map-area, Quebec, by B. R. McKay.
- Memoir 128.** Winnipegosis and Upper Whitemouth River areas, Manitoba, Pleistocene and Recent deposits, by W. A. Johnston.
- Memoir 130.** Geology and mineral deposits of the Bridge River map-area, British Columbia, by W. S. McCann.
- Memoir 131.** Kenogami, Round and Larder Lake areas, Timiskaming district, Ontario, by H. C. Cooke.
- Map 1585.** Mackenzie River basin, 1922 edition. Geology.
- Map 1751.** Wainwright, Alberta. Topography.
- Map 1752.** Monitor, Alberta and Saskatchewan. Topography.
- Map 1754.** Upper Elk and Highwood rivers, British Columbia and Alberta. Topography.
- Map 1829.** Salmon River area, Portland Canal mining division, B. C. Geology.
- Map 1831.** Vegreville; townships 47 to 55, ranges 11 to 16 west of the 4th meridian, Alberta. Topography.
- Map 1835.** Beauceville, Beauce county, Quebec. Geology.
- Map 1836.** Explored routes in a belt traversed by the Canadian National Railways between Longlac and Nipigon, Ontario. Geology.
- Map 1860.** Keno Hill area, Mayo district, Yukon. Geology.
- Map 1882.** Bridge River, B. C. Geology.
- Map 1901.** Upper Kitzault valley, B. C. Geology.
- Map 1948.** Wanapitei Lake area, Ont. Geology.
- Applicants for publications not listed above should mention the precise area concerning which information desired.
- The Geological Survey will, under certain limitations, give information and advice upon subjects relating to general and economic geology. Mineral and rock specimens, when accompanied by definite statements of localities, will be examined and their nature reported upon.
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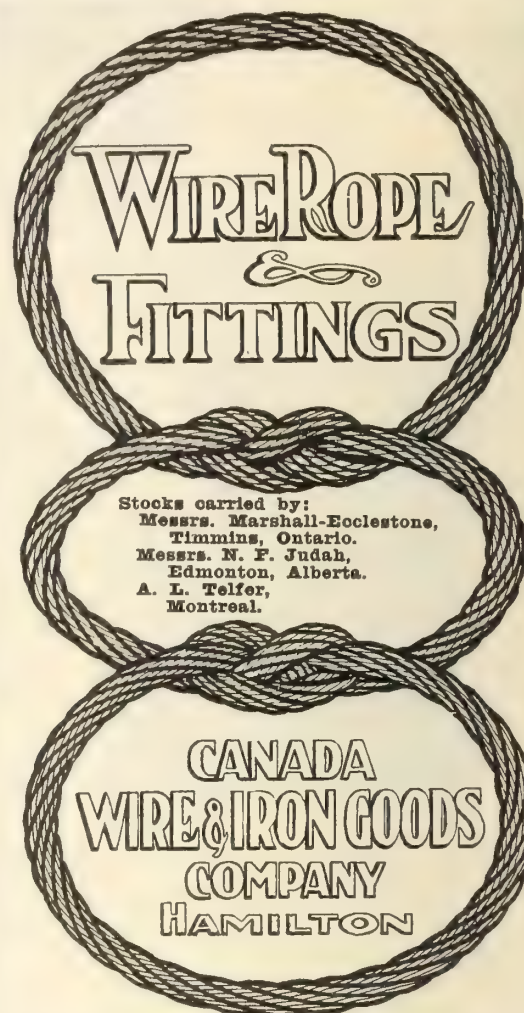
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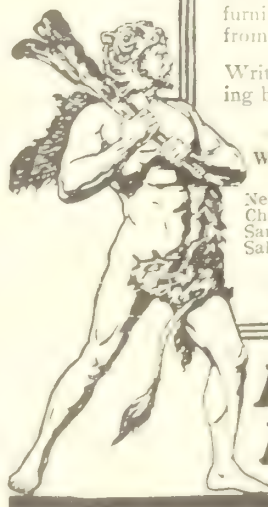
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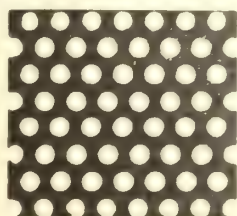
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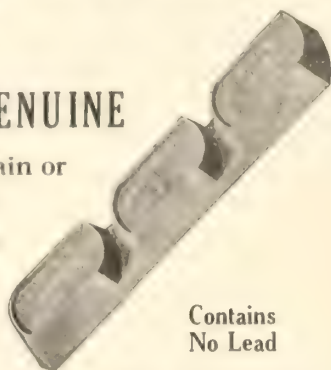
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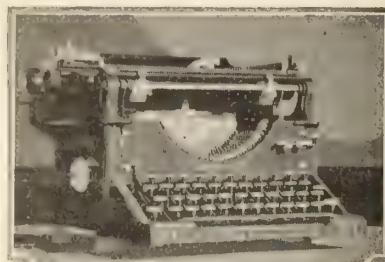
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The Cameron Vertical Centrifugal Pump is another development for the mining industry carrying all the distinctive features of Cameron design.

The unit consists of a Cameron double suction volute Centrifugal Pump direct-connected to a vertical motor. The pump and motor are both fixed rigidly to steel frame work so constructed that the complete outfit can be lowered down the mine shaft guides.

Vertically split casings and bearings give easy access to the few parts subject to wear or requiring adjustment.

An amply proportioned Kingsbury Thrust Bearing equipped with centrifugal oiling device prevents all possible chance of bearing trouble.

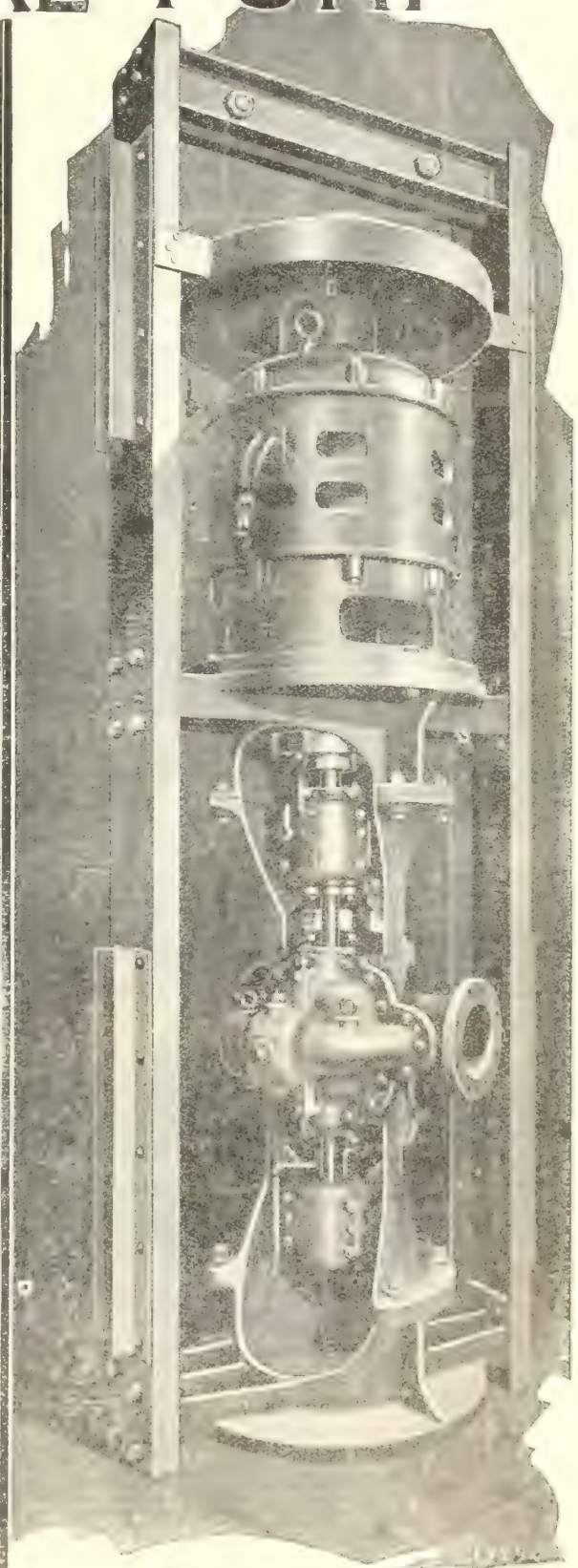
This type of pump is designed in capacities from 2,000-10,000 G.P.M. With a pump of this large capacity at your service there is little chance of serious flooding that might result in temporary abandonment of your mine.

### *Consult our Engineers*

Let them solve your Pump problems

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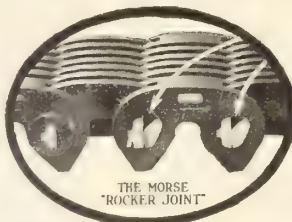
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*A few of the Morse chains in use at the Raymond Lead plant*

Using chain drives speeds up production,  
 cuts belt expense and overtime wages and  
 operates with practically no repairs.

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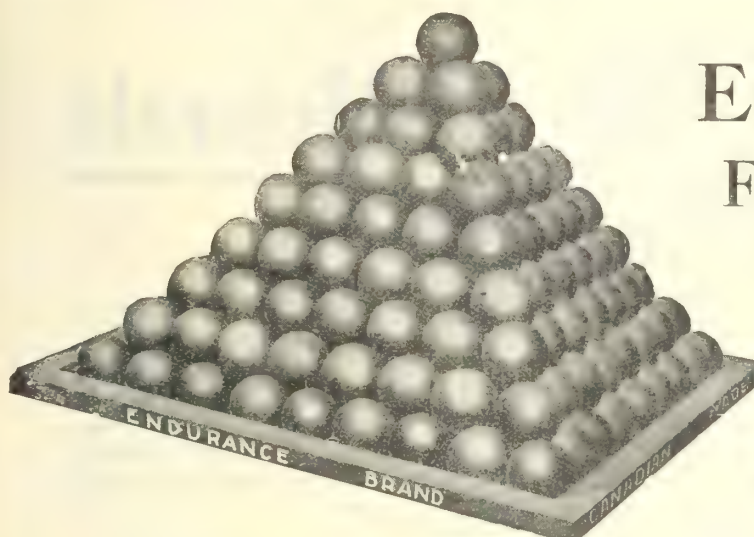
O. W. Ludwig, Plant Superintendent of the  
 Raymond Lead Co., Chicago, says:

"Thirteen years of service without a repair is our experience with two 100 H.P. and ten 20 H.P. Morse Silent Chain Drives.

"When we moved into our present plant thirteen years ago, we installed the present Morse equipment of silent chains for our two lead mills and ten hydraulic pumps. We had always previously used leather belts, but not without considerable trouble. For instance, if the operator was not careful—and gave the motors too great a load, the leather belt would slip and in some cases burn out. While with the Morse Chain Drive we overload them at times up to 15 H.P. without the slightest trouble.

"When we used leather belts on the hydraulic pumps, if a pump packing suddenly gave way, the water would squirt all over the pump as well as adjoining pumps, causing the leather belts to get wet. This often necessitated a shut-down on 3 to 4 pumps to dry out each belt, thus causing a loss of time by the men, which resulted many times in paying overtime to catch up on the work. Of course, with our Morse Chain Drive we have no such trouble—this positive drive prevents slippage and is not affected by water.

"Leather belts lasted us 2 to 3 years at the most, while our Morse Chain Drives have already lasted 3 to 4 times that long and seem good for many more years. So Morse Drives have cut our expense materially, speeded up production, cut out overtime wages and saved floor space, for they operate on shorter centers."



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Record of Performance

If efficient and economical grinding service is essential you should order ENDURANCE GRINDING BALLS.

ENDURANCE will materially reduce your grinding costs and save you unnecessary annoyance and cost.

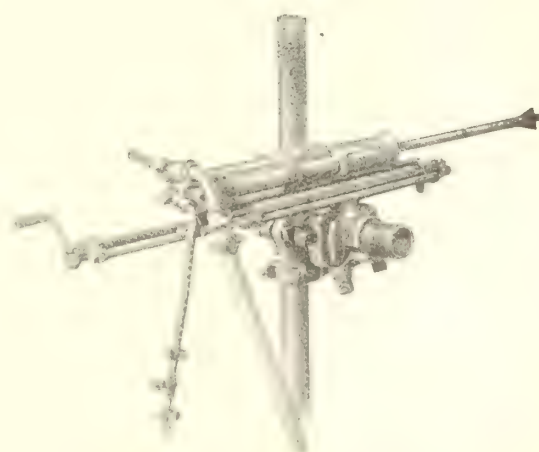
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**T**HE Imperial Government Railways of Japan are using many **Sullivan Water Drifters** in their heavy tunnel construction work. The selection of Sullivan drills was made after long and thorough tests with several competing types, on the basis of Cutting Speed, Air consumption and repair economy.

Discriminating rock drill users everywhere know the consistent, dependable character of **Sullivan Water Drifter** performance. **Sullivan Drill** engineers are pioneers in the design and construction of modern rock-drilling machines.



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*Ask for Bulletin 670-S*



# Ontario's



# Minerals

PROVINCE OF ONTARIO

DEPARTMENT OF MINES

HON H. MILLS, Minister of Mines

## Mineral Areas.

Ontario, with its 407,262 square miles, contains many millions of acres in which the geological formations are favorable for the occurrence of minerals, 70 per cent of the area being underlain by rocks of pre-Cambrian age. The phenomenally rich silver mines of Cobalt occur in these rocks; so also do the far-famed nickel-copper deposits of Sudbury, the gold of Porcupine and Kirkland Lake, and the iron ore of Magpie and Moose Mountain mines.

## Economic Minerals.

In addition to the above, practically all economic minerals (coal and tin excepted) are found in Ontario:—actinolite, apatite, arsenic, asbestos, cobalt, corundum, feldspar, fluor-spar, graphite, gypsum, iron pyrites, lead, mica, molybdenite, natural gas, palladium, petroleum, platinum, quartz, salt, talc and zinc. This Province has the largest deposits on the continent of talc, feldspar, mica and graphite.

Building materials, such as ornamental marble, limestone, sandstone, granite, trap, sand and gravel, lime, Portland cement, brick and tile, meet every demand.

## Mineral Production.

Preliminary returns show the output of the mines and metallurgical works of the Province for the year 1921 to be worth \$48,128,387, of which the metallic production was \$27,574,202.

The following figures show the rapid growth of Ontario's mineral industry by five-year periods since 1891:

| Year.          | Value.      | Year.          | Value.       |
|----------------|-------------|----------------|--------------|
| 1891 . . . . . | \$4,705,672 | 1906 . . . . . | \$22,388,383 |
| 1896 . . . . . | 5,235,003   | 1911 . . . . . | 41,976,797   |
| 1901 . . . . . | 11,831,086  | 1916 . . . . . | 65,308,822   |

## Dividends.

Dividends and bonuses paid to the end of 1921 amounted to \$23,140,734 for gold mining companies, and \$84,388,185 for silver mining companies or a total of \$107,528,919.

## Mining Regulations.

A miner's license costs \$5.00 per annum, and entitles the holder to stake out in any or every mining division three claims of 40 acres each. After performing 200 days' assessment work on a claim, patent may be obtained from the Crown on payment of \$2.50 or \$3.00 per acre, depending on location in unsurveyed or surveyed territory.

## Assay Office.

The Provincial Assay Office at No. 5 Queen's Park, Toronto, is maintained by the Department of Mines for the free identification of minerals, free assays under the provisions of the Mining Act of Ontario, and also for general assay work as per the Schedule of Charges which may be obtained on application.

## Temiskaming Testing Laboratories

The Department maintains, at Cobalt, an ore sampling and testing laboratory which is now prepared to receive parcels of gold ore from 100 pounds upward, and after sampling and assaying the same to pay to the shipper the value thereof, less treatment charges. The purpose is to afford a market for ores extracted by prospectors and others in developing their mining claims, enabling them to obtain funds which they can use for further work and to report on the most satisfactory method of treatment. Fuller information may be obtained on application to the Manager, Temiskaming Testing Laboratories, Cobalt, Ontario.

## Publications.

For list of publications, illustrated reports, geological maps and mining laws, apply to

THOS. W. GIBSON,  
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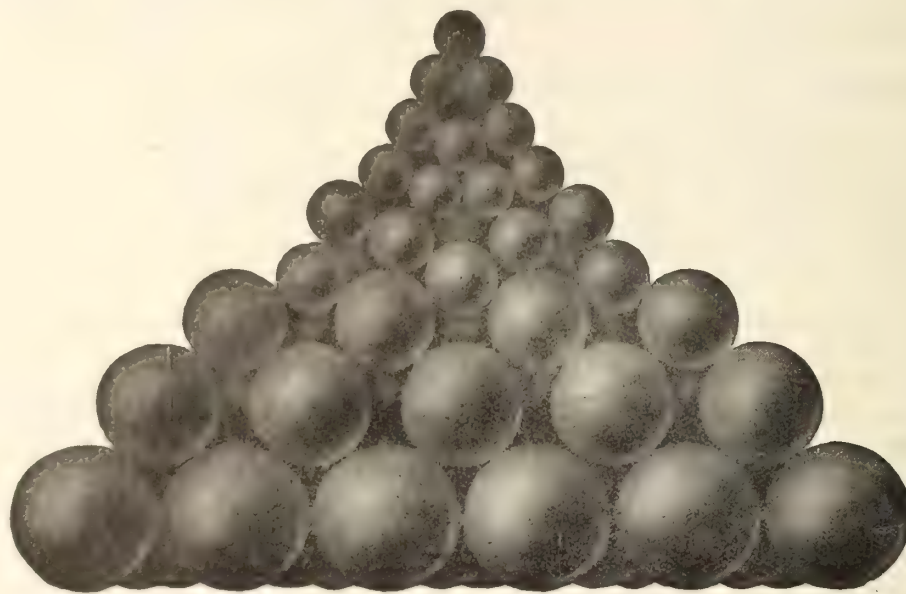
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# :-: EDITORIAL :-:

## A BILL TO IMPEDE MINING

The Senate of Canada has before it a Bill whose passage would interfere very seriously with the mineral industry. Senator Boyer, of Rigaud, Que., has introduced Bill D., *An Act to amend the Explosives Act*, as follows:

"Section seven of *The Explosives Act*, chapter thirty-one of the statutes of 1914, is hereby amended by adding thereto the following as subsection (3) thereof:—

"(3) Notwithstanding any other provision contained in this Act, no regulation made by the Governor in Council under this Act shall authorize the issue of, and the Minister shall not issue, any license for the establishment location or maintenance of a factory or magazine within two miles of any other building, structure, or premises, except licenses for continuing the maintenance of such factories or magazines as have been established, located and maintained under licenses issued before the date of the coming into force of this subsection."

The meaning of this Bill is plain. It would place every powder magazine in the centre of an isolated area of approximately sixteen square miles. Every mine would have to build its powder house at least two miles away, and probably much further, and to maintain a road for that distance. A hardware merchant selling explosives would find it almost impossible to comply with the regulations, as it would be very difficult for him to find within reach the requisite area of sixteen square miles in the centre of which to set his magazine. The proposed Act is ridiculous, and should be promptly rejected by the Senate at the next reading.

The present *Explosives Act* has been carefully formulated by men with wide and thorough knowledge of the requirements. Under its provisions the manufacture and use of explosives has been made as safe as is humanly possible. There will be found, no doubt, good reason to modify some of the regulations and to add new ones as time goes by; but these changes and additions can safely be left in the hands of the federal and provincial technical officers whose duty it is to supervise and regulate the use of explosives. These technical staffs are of adequate size, they comprise men with unquestioned qualifications for their work, and their record in performance of their duties shows that the public has been adequately protected from the undoubted dangers inherent in the manufacture and use of explosives.

Senator Boyer's Bill is a mischievous and meddling piece of proposed legislation. The Senator lives at Rigaud, Que., not far from the factories of Northern Explosives, Limited. This may account for the mental bias that has promoted the formulation and presentation to the Senate of Bill D. It is incumbent upon the mining men of Canada, as those that would be most seriously affected by the passage into law of such a measure, to see that it is either withdrawn or defeated.

## EAST AND WEST

The Canadian Institute of Mining and Metallurgy has a very important asset in the energy and good will of the members of its British Columbia Division. We print on another page the annual report of the Secretary, Mr. H. Mortimer-Lamb, which appears this week also in the Institute's *Bulletin*. Its careful perusal will repay the attention of those interested in the Institute's welfare, as well as of those who wish to do their part in directing the growth of Canada's mineral industry along rational and sound lines and in preventing undue sectionalism.

As the report points out plainly, apathy is one of the best marked characteristics of Institute membership at present. A considerable number of Western members have banded themselves together to combat this evil, and the past year's record gives a decided promise of final success. These members have faced their problem squarely and find that, as with the Institute at large, long distances and the proportional expense of travelling and a wide diversity of occupation tend to prevent the united and continuous personal effort without which no Institute activities can be fully successful. They have proposed means to overcome these difficulties and have put some of them into effect. The fact that the registered attendance both at the Annual General Meeting of the Division and at the General Western Meeting of the Institute in Vancouver was approximately the same as that of the Annual Meeting of the Institute in Montreal is sufficient to indicate that the British Columbia Division is one of the most active parts of the Institute. The genuine interest of Western members is attested by the fact that the expenses of the General Western Meeting were met by the Division, without recourse to the Institute's coffers. This is an evidence of good faith that should be noted by members in the East.

The British Columbia Division has come into being by a process of devolution. The fact of the geograph-



real separation of the mining districts, east and west, cannot be ignored with impunity. There are local interests and local conditions that can be dealt with only by a local organization. Nevertheless there is a community of interest from Atlantic to Pacific quite sufficient to bind the local units into a strong and powerful Institute. It is these common interests that are the especial concern of the Institute Headquarters. The British Columbia members have announced by word and deed, their interest in the affairs of the Institute at large, and on every possible occasion they make it plain that they are determined to preserve and to develop further the present means of coöperation with Headquarters.

Judging by the proceedings of the Annual Meeting in Montreal last March, where the British Columbia members were without direct representation, the members of Council and the private members of the East have failed to grasp the full significance of the Western members' activities, which are not only held somewhat in suspicion but are not rated at their true worth. The *Canadian Mining Journal* is involved in this judgment, and we freely confess it. Three thousand miles constitutes a distance it is difficult to bridge merely by means of the mails. For ourselves, we hope to find a means whereby the Western point of view and Western activities will be more accurately and more adequately represented in our pages. For the Institute, we trust that the energies and good will of the British Columbia Division will be used as a means to forwarding the general interests of the Dominion's mineral industry.

### KEELEY

In the first of a series of "Letters from South Lorrain" that we print today, Mr. Murray gives briefly the history of that silver camp of rising fame. This is virtually the story of the determined efforts, now well known to the mining public, of one man, Major J. Mackintosh Bell. In commenting on "The New Keeley Stock" in these pages two months ago, we failed to do justice to the proved resources of this mine, and made a prognostication that has, fortunately, failed so far to materialize.

On the result of Major Bell's good judgment and tenacious purpose, we do not need to dwell; the Keeley mine of today tells the story. Our conclusion made in March, and not yet established in fact, was that Major Bell's financial associates had decided to put the new Keeley stock "on the market" in Canada, with all that such a move involves. Both financial sponsors of the Keeley are well-known "market" men, and the signs pointed marketward. Fortunately, we say, our conclusion has proved so far to be wrong, and we hope our prediction will never be fulfilled.

It is incumbent upon the mining engineers of Can-

ada to prevent by every means in their power the financial manipulations conducted in the names of the mines they manage.

### EFFECTIVE REGULATIONS IN BRITISH COLUMBIA

In his address at the international mining convention at Spokane, which appears on another page, Hon. Wm. Sloan, Minister of Mines for British Columbia makes some interesting observations on the measures adopted by his government to prevent the public issue of fraudulent or doubtful mining stocks. He points to the well-known fact that during former mining booms in British Columbia (particularly, we take it, that at Rossland) the public were "gouged" to such an extent by dishonest promoters that genuine mining development suffered for years afterward, and indeed only now, a quarter of a century later, has fully recovered.

Though there is no "Blue Sky" law, Mr. Sloan testifies that regulations now in force are adequate to the need. All promoters are required to submit to the scrutiny of the resident government mining engineer of the district in which their property is situated, prospectuses and other such statements designed for publication. If these statements are inaccurate or misleading, the Minister of Mines has authority to publish the facts. This threat of publicity in a case of attempted fraud is, Mr. Sloan says, sufficient to deter fraudulent mining schemes.

This statement by British Columbia's Minister of Mines has decided significance for those interested in the mineral industry of Ontario and Quebec, whose citizens are at present without adequate protection from dishonest mining stock promoters. The "Blue Sky" law in Ontario is not to be applied to mining promotions until next September, and only then by special proclamation. Meantime the hucksters of worthless mining script are to be allowed free rein.

The preventive measures in the Ontario act are, in their essence, the same as those that are said to be effective, and yet not burdensome, in British Columbia. It is not a perfect law; few laws are perfect; but it might have a very salutary effect during the coming season, which threatens to produce a crop of dishonest and senseless promotions that will choke the growth of the honest ventures in the same fields.

Judging by the public utterances of the premier of Quebec and some of his colleagues, the provincial Government wishes to throw its weight on the side of honest mining development. This might well be accomplished by a simple regulation modelled on that of British Columbia, which avoids the opposition stirred up by the term "Blue Sky" while effecting the desired result.

Whatever the means adopted, the men of the mining industry should unite in self-defence against those

who are at present preying upon the public in the name of the industry and making the name of mining to stink in the nostrils of thousands of Canadian citizens whose money would otherwise be available for finding and developing Canadian mines.

### AN UNDISCHARGED RESPONSIBILITY

The damage done to legitimate issues of stock of industrial undertakings as well as of sound mine promotions is indicated clearly in the pages of our daily newspapers. Last week a prominent paper, known better for its large circulation than for any evidence of sound judgment in its financial pages, carried a display advertisement of mining stock of very doubtful character, and at the same time warned the public, by means of a cartoon on another page, against the angling tactics of dishonest mine promoters. Which bit of evidence are we to believe? Again, the newspaper that has, probably, the best financial pages of any daily in Canada has carried, successively and in the same position as well as in the same typographical style, the advertisements of this same doubtful mine flotation and then of a well-established hydro-electric power company. What sort of service is it that this highly respectable daily is giving its readers? Our financial papers are guilty of exactly the same lack of discrimination. The moral is obvious; publishers with any intention of honest service to their readers must consult men conversant with the truth about mining finance if they are to avoid these pitfalls.

### FIRES AND AEROPLANES

The forest fires are running in the North. Press despatches and private information show that, already this season, someone has been careless in each of several localities. There is evidence to show that this year, as never before, there is to be made a determined and concerted effort to keep the fires at a minimum, so we can hope that these first fires will but add energy to the application of preventive measures.

Last year the Ontario Forestry Branch surveyed, by means of sketching from aeroplanes and by occasional landings, an area of 16,000 square miles, of which little was known previously, between James Bay and the Canadian National Railways on the north and south, and the interprovincial boundary and the Mattagami River on the east and west. The "Aerial Forest Type Map" on a scale of four miles to the inch that has resulted is a revelation in two ways; it shows how good a map can be made, cheaply and quickly, by this means and it discloses the fact that, south of the swampy land surrounding James Bay, about one-third of the area has been swept by forest fires. Neither the prospector nor the lumberman have travelled much within this little known area, and yet fire has wrought wide spread destruction.

The services of the airman are to be used extensively in preventing, detecting and fighting forest fires during the coming months, both in Ontario and in Quebec. His services as a surveyor are not so well known to the public, and the new map of the Ontario Forestry Branch referred to may mark the inauguration of a definite determination of our resources in timber and pulpwood that will stimulate their preservation from fire and their proper use.

There is much that the aerial surveyor might do for the progress of the mineral industry. The geological surveyor and the prospector in Ontario and Quebec now travel "blind" through the woods, seldom knowing what is in store for them a hundred yards ahead through the trees. A topographic map such as this "Aerial Forest Type Map" would be an inestimable advantage to these adventurers on foot, and would certainly save many times its cost. The use of the aeroplane as an aid to the geologist and the prospector remains still, however, a matter to be determined by mutual consultation and concerted experiment. It has great possibilities.

### VERS LIBRE

(Inspired by the advertisements of F. C. Sutherland & Co.)

This is free verse—

*Vers libre*—

Emancipated from rhyme,

But yet not

Totally

Devoid of meaning.

Not at all.

Into the rotunda of the King Edward

Casually dropping,

There met I a very

Receptive person.

Said: "If

" You had now an income of 50,000

" Iron men

" Annually accruing to you

" From the Hollinger Mine,

" You would not feel

" Too darned badly, now would you?"

Said he: — "Not to any

" Very large or varied extent."

These were his words.

" Go to," said I "and

" Come upstairs with me,

" And

" I'll show you maps, plans,

" Etcetera, of a mine that has Hollinger

" Skun a mile."

He came.

Although this is very

Free verse,

I shall go no further.

J. C. M.



## Developments in Gold Mining in Manitoba

by R. C. WALLACE.\*

At the beginning of summer operations a short statement of the prospects in gold mining in this province may be in order. Following the field operations of last season, some of which were disappointing, there has been a dull period in mining affairs. It must now be noted, however, that work is progressing quietly but very satisfactorily in the two main areas where gold is being sought, and that very considerable interest is being taken by outside capital in properties already partially prospected, as well as in prospecting for new finds.

### Herb Lake

In the Herb Lake field, in the east end of the mineral belt north of The Pas, the main operations are on the Bingo property, which lies northeast of, and practically adjacent to, the Rex mine. Development work on the Bingo is being financed by London capital, under the direction of Mr. Joseph Myers. There has been in-

ment has yet been made. The Rex has suffered from financial vicissitudes, and everyone interested in the district would like to see it in strong hands. The property itself is attractive from many points of view.

### Elbow Lake

In the same field there is an occurrence of silver in galena which is now being investigated by American interests. Diamond-drilling will be necessary in order to explore this property. In the Elbow Lake field, in which there was a considerable amount of exploration work done last summer, work is still in progress on the Murray property, on which the Hollinger interests held an option last summer. The work is financed in eastern Canada, and the intention is to continue the shaft, and to drift underneath the lake westwards from the line of last summer's operations. A diamond-drilling programme has also been discussed, the extent of which



Bingo Mine, Herb Lake, The Pas District, showing New Power House, Headframe, and 1200 cords of wood for use this summer.

stalled by the Engineering Equipment Company of Montreal during the latter part of the winter months a complete equipment for developing the property, and work is now practically under way underground. The equipment includes a 100 H. P. Inglis boiler, a 60 H. P. Inglis boiler, a Sullivan air compressor with 709 cub. ft. capacity, a Waugh drill sharpener 3 Waugh hammer drills, and complete general equipment. Mine buildings have also been erected, and development work will proceed from the 200-foot level by drifting 200 feet and then crosscutting to the parallel veins closely adjacent to the main vein. The shaft will then be sunk to the 500-foot level, and the main and other veins will be explored at that level. The company is conducting operations in an efficient manner, and if their development work proves successful they will strengthen considerably the district as a whole.

It is generally believed that the Rex has recently been taken over by a company whose name would guarantee real development of this mine, but no announce-

ment will doubtless depend on the success of the present operations.

The other main area in which work is proceeding is the Rice Lake field, east of Lake Winnipeg and approximately 100 miles northeast of Winnipeg. Here the important work is being done on the Luleo property, north of the Hole river, where operations have been carried on during the past two years by a group of New York business men, under the name of the Selkirk Gold Mining Company. They are operating on the largest width of quartz, in a shear zone, on which underground operations are being carried on in the province. It is not expected that ore will be found over the whole 30 feet of quartz, and surface sampling indicated that special attention might be paid to that part of the shear zone near the walls. Approximately 1,000 feet of underground work has now been done, at the 125-foot, 210-foot and 310-foot levels, and the 20-stamp mill on the property will be used this summer for test purposes. This mill will be scrapped later and a suitable mill of larger capacity installed, if the operations give results to justify large

\*University of Manitoba, Winnipeg.



scale mining. The company is well equipped financially and a successful outcome of their operations would mean much to the Rice Lake district.

Work is also going on at the Gold Pan, well known in the past for its spectacular ore. Pittsburg interests have the property on lease, and are engaged in exploring it. A 5-stamp mill is being erected to handle the output for the immediate future.

nipeg river, and railway and power facilities to this field would the more readily be extended to the Rice Lake district later, if the demand became insistent. 2,000 feet of diamond-drilling has now been done, in shallow holes, and the management is satisfied with the results to date.

In Northern Manitoba no further work on the Flin Flon property has yet been announced. There is a



Luleo Mine, Rice Lake District, showing Mine and Mill Buildings.

### Copper Properties

This article deals specifically with gold mining development. A word about copper prospects may assist in giving a clearer picture of metal mining development as a whole. The much welcomed rise in the price of copper has placed the development of the copper bearing areas of Manitoba within the realm of practical possibility. Work has been going on since the beginning of this year in diamond drilling the Devlin-Martin copper nickel group north of Lac du Bonnet. This is to some degree a key district to the Rice Lake field as well, lying as it does between the Rice Lake area and the new Manitoba Power development on the Win-

very tangible interest in other copper properties in the surrounding district. The Baker-Patton group has been optioned within the last month, and other prospects are now being investigated. During the winter parties were in the Kississing (Cold) lake area on a silver hunt, and they report a large outcrop of copper sulphide, which will be looked into this summer. Developments in copper would immediately stimulate gold mining as well in all the districts.

The present season opens with some very substantial work being done in the two main districts, with mining capital definitely interested, and with some organised plans to prospect for new properties.

### PRE-GLACIAL WEATHERING IN NORTHERN ONTARIO

In the current issue of *Economic Geology*, J. B. Tyrrell draws attention once more to examples of pre-glacial weathering in Northern Ontario, on account of a statement by A. R. Whitman that "residual soil of pre-glacial age is thus far unreported from the surface overridden by the Pleistocene glaciers of Ontario". Mr. Tyrrell says:

"In a letter published in the number of *Economic Geology* for July-August, 1920, pp. 453-454, I drew attention to the existence in Northern Ontario of pre-glacial oxidation and decomposition of the rocks, and gave instances of such decomposition from the Porcupine District and from the Matachewan District fifty miles to the southeast of it. Other instances might have been cited, such as a residual deposit near Sturgeon lake which was worked for a short time as a placer mine, and the glaciated surface of gossan near the Creighton mine, but the two instances mentioned in my former letter seemed quite sufficient to exemplify my point.

In *Economic Geology* for June-July, 1922, Dr. A. P. Coleman, late professor of geology in the University of Toronto, and one of the ablest students of glacial geology, gives a number of instances of the occurrence of residual soil of pre-glacial age in different parts of the Province of Ontario, extending from Michipicoten, north of Lake Superior, southward to Toronto and Niagara.

"But perhaps the most interesting record of the occurrence of pre-glacial oxidation in northern Ontario

was given by Dr. J. Mackintosh Bell in a paper which he read before the Institution of Mining and Metallurgy of London, on the 16th of February last, describing a silver vein in the Keeley Mine in the South Lorrain District, 20 miles southeast of Cobalt, in northern Ontario. This vein, and others in the immediate vicinity, are in pre-Cambrian greenstone and diabase, and consist for the most part of calcite, smaltite and native silver. The vein itself and the adjoining country rock is shown to have been oxidized and decomposed to a depth of 420 feet at least, which was the greatest depth then reached in mining, and that this oxidation was undoubtedly pre-glacial in age.

"In *Economic Geology* for June-July, 1922, Dr. A. P. W. Knight, Assistant Provincial Geologist of the Province of Ontario.

"In view of the above records of facts, it will be necessary for those dealing in any way with ore bodies in northern Ontario to realize that the glaciers which covered the country during the Glacial period did not carry away all the soft, oxidized, or residual material, and that such material may still be found in many places under a covering of boulder clay."

There is to be inaugurated in June in Australia an aerial mail service, which will encircle the Commonwealth. The points of call will include many localities at present difficult of access. Broken Hill and Kalgoorlie will be among the stations. The climate of Australia is ideal for aerial navigation.



# LETTERS FROM SOUTH LORRAIN

I PAST AND PRESENT

As is often to be expected, there has been argument and cavilling about the degree of credit due the mining geologist whose diagnosis and prognosis were the immediate cause of the revival of mining in South Lorrain. Much of this argument and cavilling was, so to say, sired by ignorance out of that fecund dam, prejudice. And most of it has been in exceeding bad taste. He who takes the pains to visit Silver Centre, South Lorrain, and observe and learn at first-hand, will find that there is no room for argument. The recorded facts are indisputable.

Silver ore was first discovered in South Lorrain on the claim now known as the Keeley, in December, 1907, by Keeley, Wood, and José, three well known prospectors. The claim had been originally snow-staked by the Shone brothers of Haileybury. The discovery consisted of rich specimens of wire silver and argentite, much weathered and oxidized. No general prospecting was done, however, until the summer of 1908.

The brief and fitful life of South Lorrain during the following few years is a matter of history. The Farmers' Bank provided cash to the amount of \$1,000,000 in exchange for perfectly worthless bonds. This sum was used in paying for the two claims, Keeley and Beaver Lake, that constitute the present Keeley property, and in equipping and operating the mine for slightly more than two years, when it was closed down, apparently for all time. A neighboring property, the Wetlauffer, had produced some bonanza ore during this period. It is reported that one vein produced no less than 3,000,000 ounces. The Wetlauffer company obtained an option on the Keeley in 1911 and did some work on it during the winter of 1911-12. Meeting with no encouragement whatever, the work was stopped and the option given up after a few months of underground exploration.

In the autumn of 1912 Dr. J. Mackintosh Bell first visited South Lorrain. Except for the last flicker of activity at the Wetlauffer, the camp was dead.

Dr. Bell's co-ordination of geological and topographical data gave him what he took rightly to be the key of the situation as regards ore deposition. Early in the year 1913 his London principals consented, on his strong recommendation, to take an option on the Keeley and to provide money for re-opening, equipping, and operating the mine. Work was carried on until the outbreak of war. Dr. Bell, after active service in France and Siberia, returned to Canada. Very little development had been done in his absence. The option on the property was finally implemented in the year 1918. By this time a considerable amount of milling ore had been developed and the erection of a mill was decided upon. Again Dr. Bell's London principals furnished the money. The abnormally high cost of skilled labour, together with other adverse circumstances, made it impossible to keep expenditure within estimated limits. Once more London came to the rescue. Not until the autumn of 1921, eight years after Dr. Bell's first visit to the camp, did the first proportionate reward for these years of patient waiting come. It came in the form of bonanza ore-shoots in the now famous Woods' vein. On the 3rd and 5th levels (a lean zone intervening) spectacularly rich ore-shoots were brought in

as the result of systematic underground prospecting. It was not long before there was enough ore developed and indicated to assure the mine a profitable (even if brief) life. Further development proved the persistence of these shoots to the 7th level and indicated their probable continuance below that level. Other veins were cut and other rich shoots opened. At the present time (I write this without official sanction and in a manner directly at variance with the meticulously restrained policy of the Keeley directorate) the ore reserves of the Keeley, to the 7th level, represent enough milling ore to supply the mill, the capacity of which is presently to be doubled, bringing it up to 150 tons per day, for several years, regardless of current and future development. There is also enough shipping ore in the stopes to maintain continuous shipments of high-grade for an equally long period. It is significant that the ore reserves are now very much larger than when the mill started, and that returns have consistently exceeded estimates. The silver content of the ore reserves at the close of 1921 was double that of the previous year. Similarly the estimated reserves at the close of the year 1922 represented twice as much silver as did these of 1921.

\* \* \*

The Keeley is now a success, as is also its neighbor, the Haileybury Frontier, owned by the Mining Corporation. As regards the constructive faith and clean spirit of intelligent venture shown by the English directorate of the Keeley in giving their continued financial support to an enterprise based wholly upon geological deductions, I can think of no parallel case where Canadian capital has been involved. Canadian capital demands something more tangible, and demands, also, a larger *quid pro quo*.

I doubt if more than two or three mining men in the North and otherwheres believed until quite recently that in contrast to the ore deposits of Cobalt, the Lorrain in general, and the Keeley mine in particular, were regarded not as merely moribund, but as dead and finally interred. Even the easily substantiable statement that in contrast to the ore deposits of Cobalt, the Keeley deposits are in places intensely oxidised was received with scepticism. In short, South Lorrain was extinct and better forgotten.

It took something more than ordinary courage to persevere against the obstacles that nature had provided. Perhaps the jibes of the scornful acted as a stimulant. In any case, the resuscitators of the Keeley may now inscribe Q.E.D. after the expectations that Dr. Bell held out to them eight years ago.

\* \* \*

The one regrettable feature of the revival in South Lorrain is the cheap and nasty advertising that certain promoters, interested in properties near the Keeley and Frontier mines, are now spreading broadcast over the land. In a later letter I shall refer to one, perhaps two or three, of these. The Keeley and Frontier are being operated on their merits, soundly and carefully. It is lamentable that their names should be prostituted by irresponsible outsiders. The good character of the camp must and shall be preserved.

J. C. MURRAY



# British Columbia's Heritage of Minerals

MINISTER OF MINES ADDRESSES NORTHWEST  
MINING CONVENTION IN SPOKANE.

On May 24th, Hon. Wm. Sloan, Minister of Mines for British Columbia, addressed the Northwest Mining Convention, held this year in Spokane. His address, in part, follows:

From me, no doubt, you will expect to hear something about mining, more particularly in my own province of British Columbia. I can say, without further preface, that never since I assumed office as Minister of Mines seven years ago have conditions been better or the outlook brighter. Now that is saying a great deal, for it will be remembered that the years 1916, 1917 and 1918 were big years in point of production. The value per annum of British Columbia's output ranged round the forty million mark. These were the years of the Great War. Demand for the product of the mine the world over was insistent, prices were high, everywhere was inflation. It was an unnatural condition, but it is generally conceded that those who had "the goods" benefited as far as profits are concerned. But it was a boom that was bound to be followed by more or less depressing reaction and that reaction came. I believe it has come and gone. The present conditions in the Province to the north of you point to a revival, not of the unhealthy prosperity of the war days, but towards progress and prosperity built upon the solid foundation of developed resources and the normal demands of the markets of the world.

## Eastern Capital Required for Western Development

Our production in terms of money for 1922 was not as great as it was in the big years to which I have referred, but it was approximately 25 percent greater than in the previous year,—over thirty-five million as compared with twenty-eight million. These figures illustrate the fact that I should like to make the keynote of my remarks—that we are on the "up grade." But it is not alone the fact that the Province of British Columbia has made an advance upon which I am depending. It is the fact that from all quarters there come assurances that we may go forward with confidence. We need capital in this western country and that capital, the "sinews of war" to mining, comes from the east. There was a time when Russian investments, Asiatic enterprises, middle European projects, and so forth were launched in the money markets of the world with success. It is unnecessary for me to say that a Russian bond issue in London or New York to-day would not receive much consideration; nor is it probable that requests for funds from any of the other countries I have mentioned would be more welcome. Where is the world going to place its reserves that they may be given a fair chance to multiply? I suggest that it does not require much insight to give the answer. The capitalists are turning more and more to western America and to those few other countries where today there appears to be stable government.

All the information I have received from London confirms what I have said, and I believe that it is true also of the great money market of New York. The people with funds are looking west. We have the resources requiring development; they have the means to assist in that vitally important work. What we have to do is to be good, reliable sales agents, displaying our wares without misrepresentation, and securing for their exploitation what their

worth seems to merit. If we adopt this as a principle in the prosperous days I see ahead, there is no doubt that the Northwest will be opened up in the next decade on a scale unprecedented in any previous period, to the lasting benefit both of ourselves and of those who will follow us.

## Reasons for Hopeful View of the Future

To revert to conditions in British Columbia, there are several reasons for my optimism of today. When I review the situation broadly it seems to me that we are justified in taking an optimistic view. One of these reasons is the wonderful promise of that newly opened up mining district, the Portland Canal of Northwestern British Columbia. Another is the marked advance that has been made by one of our greatest mining corporations in solving the metallurgical problem of the economic treatment of the complex ores of the Kootenays. The third, and perhaps the most important of all, is that the copper market now seems healthy, and that means everything to British Columbia mining. If this condition persists there can be no doubt whatever but that our production will go forward with a bound in 1923. This is all the better assured by the fact that the Dominion Government has offered a bounty of 1 1-2 cents a pound on copper in bars and rods manufactured in Canada from Canadian ores. Although the matter is not of special interest on this side of the line, I mention it only to explain that I join with operators and mining men of our Province in my approval of the policy of the Federal Administration in this matter.

## Copper

While on the subject of copper let me say that British Columbia production in 1922 dropped to about thirty-two and a half million pounds as compared to the normal of approximately forty million pounds. That it is possible to show an increase on the value of the whole mineral production in the face of this decline, it seems to me, will appeal to all as rather creditable. The reason for this unfavorable showing is known to most of you. Primarily it was market conditions, and under the circumstances it is very much to the credit of one of our greatest copper producers operating in the northwest, that they were able to continue work by means of lowering their costs. Another large producing company, situated in the southwest, was assailed by misfortune. Its plant was completely destroyed by fire and flood. To this corporation is due congratulation on the spirit with which it grappled its problems. This concern has also opened up important new ore reserves, its plant has been renewed on a larger scale and with a design of more modern type, and it has now again entered the field of production. Having these facts in mind it would appear reasonable that I should be most optimistic as to the results this year.

This, however, is not everything. In the north the company to which I have referred is extending its mineral holdings and adding to its plant. Not only that, but it is understood to be acquiring important, and hitherto inactive properties on Copper Mountain with a view to immediate operation. In addition we have the new concentrating mill nearing completion at Kimberley, and the promise it gives



of releasing the Trail concentrator for the use of the ores of Rossland. Under these circumstances it is not unreasonable that we should look forward to the future with confidence.

### Lead and Zinc

Consider lead and zinc. It will be noted that the Province has been advancing in production year by year. British Columbia was responsible for a production of over thirty-nine million pounds of lead in 1920, over forty-one million pounds in 1921, and of over sixty-seven million pounds in 1922. Zinc has been going ahead in the same way. In 1920 there was produced over forty-seven million pounds, in 1921 over forty-nine million pounds, and in 1922 over fifty-seven million pounds. These are interesting and significant figures to us. They speak well for the enterprise and the progressive spirit that dominates the greatest mining corporation of the eastern interior of the Province. The indications are that the mining of the silver-lead-zinc ores of the Kootenays will continue on an ever increasing scale, that metallurgical science will continue to improve the methods of treating these ores, and as improvements are effected the independent operators should be given the benefit to an increasing extent.

### Coal

It is possible that not so many of my hearers are interested in coal mining and yet I must refer briefly at this point to conditions in British Columbia. This industry has not been going ahead as it should, having been practically at a standstill in point of production for the past thirteen years. In 1910 it reached the peak of 2,800,000 tons and in 1922 it was 2,511,843 tons. The years between show fluctuations that on two occasions have taken the total below the two million mark. Our coal resources are sufficiently great to warrant much more extensive development and output. The markets, however, are not steady. At present, for instance, we are suffering from a distinct slackness of trade that has been reflected in the production of the months of April and May in the Vancouver Island, the Interior and the Crow's Nest fields. This means that men are thrown out of work and the coal mining centres are made to feel the pinch of hard times. I do not know whether you have the same problems on this side of the line, but personally I have reached the conclusion that some action on the part of our Government is necessary in order to relieve the industry from the disabilities at present existing.

### Iron and Steel

In this connection I may say that the coal industry would be stabilized and assisted to a large extent if an iron and steel industry were launched in the Northwest. The possibilities of this are not being overlooked in British Columbia. We have large magnetite and hematite deposits, the former both on the coast and in the interior, the latter for the most part in the interior. Dr. Young of the Canadian Geological Survey is now conducting a thorough survey of these deposits under the joint auspices of the Dominion and Provincial Departments of Mines. He will be in the field again this year. His report, when it is issued, will give accurate information, commercially speaking, as to the iron ore resources of the Province. I am very hopeful that it will lead to the immediate investment of the capital necessary to start the industry in question. When it does it will mean not only stability to coal mining, but a stimulus to our general prosperity both in British Columbia and throughout the whole of the Northwest.

### The Pioneers

The Province I represent is large in area and small,

proportionately, in population. We have districts that have made mining history and continue to do so. I note that the City of Nelson recently received the rifle and the pick that the late Eli Carpenter, discoverer of the Slocan used in his explorations of the wildernesses of the interior country. It is gratifying to find that citizens of Nelson, and of other British Columbia centres, are alive to the importance of preserving souvenirs with such historic associations, for it is upon the indomitable spirit of such pioneers that the development of the mining camps of the Northwest has been based. There are many other pioneers identified with the Kootenays in the early days, with the Cariboo, and with the placer fields and lode camps of the far north, whose memories are deservedly being preserved for posterity.

What can be accomplished now in building upon the work of those pioneers has been strikingly illustrated by the phenomenal success of the Premier Gold Mining Co., in the Portland Canal District. To declare dividends of some three and a half million dollars in little over two years speaks well for the mineral wealth of our Province and its possibilities. Other properties of marked promise are being opened up in this District and it is not all improbable that more than one first-class mine will be the result of the intensive prospecting and development now in progress in that locality.

### Hudson Bay Mountain

It is noteworthy that properties on Hudson Bay Mountain, actively developed during 1922, have given most satisfactory results. In one instance at least, what was only a few months ago but a prospect is rapidly developing into a mine, having already shipped quantities of high-grade ore. The zone is reported to be well mineralized and it is not improbable that other properties will be opened up in the same region this season. It is certain that there will be much prospecting in the locality and there is no doubt that it is justified. In the Cariboo the placer discovery at Cedar Creek may be said to be a notable event from a British Columbia standpoint, for the recovery in one brief season of \$125,000 in gold dust by the primitive means of rockers alone is no mean achievement. It has served to direct attention to the great northern interior and I have confidence that the result will be greater activity in the way of hydraulicking and dredging operations as well as more prospecting. The result should be an increased production of placer gold this year.

### Vancouver Island

On Vancouver Island the mineral prospects are good. In addition to coal mining there are a number of large ore-bodies under development. One of these is known as the "Sunloch," Jordan River, on the southwest coast. The work done here has disclosed a large body of copper-bearing ore which, without a question, will be exploited on a large scale. The same applies to the Old Sport Group of claims on the west coast of the Island.

Of the Kootenays, Mr. A. C. Langley, the resident mining engineer, is here to speak in detail. It is sufficient for me to say that the prospects are very encouraging, that this section is only at the beginning as far as development is concerned, and that here, as everywhere else in the Province, will be welcomed the co-operation in person or in capital of our immediate friends south of the 49th parallel.

### Protection Against Fraud

I note there has been considerable controversy upon the question of "Blue Sky" legislation and the conditions governing investments in British Columbia. I may say that,



with regard to mining, while we have no strict and recognized "Blue Sky" Law, we endeavour as far as possible to protect the investor against fraud. The difficulties of this are well recognized. Nevertheless we are determined, as far as it is within our power, to assure for the investor a fair "run for his money," so to speak. The Mineral Survey and Development Act, which divides our Province into six mineral survey districts, each under the direct supervision of a well qualified mining engineer employed by the Government, contains a clause requiring that district mining engineers be supplied with copies of all prospectuses or other publicity matter issued by promoters and mining companies operating in this Province. If these publications are found to contain representations not in accord with the facts as found by the district engineer after investigation, the latter must notify the Minister of Mines. The Minister then has the power, under privilege, to publish the truth. This menace of exposure has been found to work out very satisfactorily so far. It certainly is a potent deterrent to the fraudulently inclined. Furthermore, we do not want and will not tolerate a revival of the conditions that prevailed a quarter of a century ago, which retarded legitimate mining to an extent from which we are only now recovering. We also provide for the payment every two weeks of men employed on properties under bond or lease, and require that security be advanced for the payment of a fortnight's wages for those employed. This is for the protection of the workmen. Our whole object in these measures, as I have said, is to see that money invested in a mining property is spent on that property and not in stock manipulation. In the main we think that British Columbia's Mineral Laws are based on sound principles. Certainly they have worked out smoothly and satisfactorily thus far, and for that reason we have not permitted constant tampering and interference with them. Our policy is to promote stability and to give to the mining man an assurance that no vital changes will be made, so that he knows where he stands at all times. I have found usually that this is appreciated and endorsed as a good policy.

### Prospecting Needed

More than anything else we need prospecting. Without the prospector's work there is small hope of our minerals being exploited. The deposits, of course, must first be found. It is gratifying, therefore, to note the recent movement manifested in the organization of Prospectors' Associations. These Associations can do, and I believe are doing, much good. They are being assisted by our district mining engineers, whose lectures, delivered during the winter season in all parts of the Province, are having the effect of stirring up interest in mining and giving the prospector good practical information and advice. The Government, too, has been spending many thousands of dollars in opening up the inaccessible parts to the searcher for minerals as well as in affording transportation conveniences to the struggling operator. We have built hundreds of miles of roads and trails and have constructed and maintained many bridges in the course of carrying out the policy of aiding the mining men in the work, fraught with so many difficulties and problems, of winning the minerals from the far distant corners of the Province. We appreciate that in doing this we are performing no more than a duty, the benefits and the returns from which may be depended upon to be realized in the near future, if not in the immediate future. The work must go on. It is possible that the prospector of a few years hence will be further aided by aerial navigation. This science is making progress, and it does not require much stretch of imagination to see the prospector being conveyed through the air with his outfit to the particular district he has selected for his

work. In fact the method already has been adopted in small measure out of the town of Hazelton, British Columbia, and before long it will be possible for the big business man of New York, Chicago, Toronto or Montreal to leave his office and within a few days, by train and aeroplane, to be in the frontier wildernesses of British Columbia inspecting a prospect and incidentally enjoying the big game hunting of the country for which our province is noted.

Decidedly we are on the "up grade." Mining men of the West have every reason for confident optimism. That is the way we feel in British Columbia. It is the sentiment that should pervade this Convention. It is the feeling that we all should carry away with us. If we grasp and hold to that idea it will be of material assistance to us as we go hence to grapple with the many problems that will arise in the course of the year's activities.

## LETTERS FROM READERS

### Forest Fires

To the Editor,

Canadian Mining Journal.

Sir:

In the April Number of the *Canadian Forestry Magazine*, the leading article dealt with a statement made by Mr. John Rudolphus Booth, of Ottawa, reflecting rather strongly upon the prospector. I have been expecting to see more indignant replies made to the statements in the article.

The article says in part:

"It does account for the swarm of prospectors' fires," he replied with sudden energy. "Take for example our Montreal River Limit, 1,700 square miles, that we bought a few years ago for \$300,000 in open competition. That, of course, is not the final payment, for ground rent, fire taxes, and cutting dues must be added. That country was absolutely green at the time we bought. Spruce stood as thick almost as corn stalks — a beautiful country, as fine as ever I saw. I could not find traces of a single fire over the whole extent. Well, we had it only a short time when it was opened to prospectors, opened, mind you, without evidence of a solitary mineral showing on any part of it, no preliminary survey of geologists. To this day, not a mine nor a real prospect has been uncovered on that 1,700 miles, but," Mr. Booth's eyes flashed a world of feeling, "a horde of irresponsible men seeking non-existent mines have destroyed from one-third to half of that country. They have ruined as much timber as would have kept our Ottawa mills running for twenty-five years and the end of their devastation is not yet. The lumberman made the roads, the lumberman paid for the timber, but the Government opened wide the doors to the prospector whose first incentive is to spread fire and clear off the surface of the rocks. I know the history of some of our forests for seventy-five years and I am frank to say that I believe every dollar's worth of mineral taken from forested land has cost the country a hundred dollars in destroyed timber. Why not make a business-like calculation of the price we pay for letting loose the prospector on the country's fast-depleting stock of timber? The showing would make us rub our eyes." etc.

There are several things in the above extract that one would like to comment upon: for instance, why should such a beautiful country with spruce as thick as corn



stake is sold at the rate of about \$175.00 per square mile, to J. R. Booth or anyone else, especially as not one stick of the timber on the seventeen hundred square miles was to be manufactured within hundreds of miles of where it grew?

Then Mr. Booth says "a horde of irresponsible men seeking non-existent mines have destroyed from one-third to one-half of that country." The Government exacted from every prospector that went on the country that Mr. Booth speaks of, a yearly fee of ten dollars for the right to prospect upon that so-called forest reserve, and if I am not mistaken, the Government received at least one hundred thousand dollars from these permits alone, and altogether from fees taken from prospectors on that same territory a good deal more money than Mr. Booth paid for the whole concession.

I wish to contradict the statement made by Mr. Booth that the territory in question was burned by prospectors. It is true, and no one will deny it, that there are some prospectors, as there are a great many lumbermen, careless about fire and it is quite possible that some fires have been started by prospectors; but the fire that destroyed the greater part of the burned territory that Mr. Booth speaks of was started by fire rangers in 1912-13. The fire rangers were camped at Alexandra Lake and I am sure that Mr. Booth's office has record of the fact that the fire started then, which burnt over two or three hundred square miles of the Forest Reserve, was started by the fire rangers in question, who burned their own camp, the fire then spreading over a large extent of the area. There were no large fires on the forest reserve set by prospectors.

Now as to the "non-existent mines". It is true there have not been many mines found in that territory yet that have paid dividends, but there are several that have procured a large amount of silver, and the Miller Lake-O'Brien, which is in the middle of the territory in question, has produced about six million ounces alone up to date, and there are others that will in time produce millions of dollars.

The whole strain running through Mr. Booth's remarks shows the lumbering idea — everything for the lumberman. The greatest trouble in his mind in regard to the devastation of the forest was that this timber that was burned would have kept the Ottawa mills running for twenty-five years. The great fire I have mentioned that was started at Alexandra Lake would probably not have spread far had it not been for the vast amount of debris with which the forest was filled from the lumbering operations.

Any prospector knows that a forest fire does not clear off the ground for prospecting. The first fire makes it ten times harder to prospect than it was before, and even a second fire generally does not improve it any. It takes, as a rule, three or four fires before the ground is cleared so that it can be of any benefit to the prospector.

I have a recollection of six townships on the Sturgeon River owned by Mr. Booth, where there was no prospecting, and they were more completely burned, and in a much shorter time following the lumbering operations, than any ground on the Montreal River district.

The statement in the article above quoted that "every dollar's worth of minerals taken from the forest or land has cost the country a hundred dollars" is absolute nonsense. The mines of Temiskaming District have produced hundreds of millions of dollars. The timber in the same district is only worth a fraction of the value that has already come from the mines, and the mines have only started.

I have a great respect for Mr. Booth and I have known him for a long time. No one doubts his probity, but like every other lumberman, he is obsessed with the idea that lumber is the only thing that should be considered.

The class of timber Mr. Booth is cutting on the Montreal River can be renewed, in 30 or 40 years without much expense; a re-forestation policy will be necessary to renew it in some sections, in others it grows naturally.

H. E. McKee,  
Cobalt, Ont.

## BOOK REVIEWS

WAVELENGTH TABLES FOR SPECTRUM ANALYSIS, Compiled by F. Twyman. Adam Hilger, Ltd., 75A Camden Road, London, N. W. I. — 106 pages — 7s. 9d. post free.

Analysis by means of the spectroscope is of growing importance as an adjunct to industry. For this purpose two sets of tables are required, one giving the wavelengths of certain radiations reproducible in the laboratory, to be used as datum points, and the other giving the wavelengths characteristic of the various elements. Both sets of tables, with adequate explanation, are given by Mr. Twyman. Messrs. Adam Hilger specialize in optical apparatus, and the present volume rounds out their facilities for spectrum analysis.

THE ENGINEERING OF EXCAVATION, By George B. Massey. — John Wiley and Sons, New York, and Renouf Publishing Company, Montreal. — 376 pages, illustrated.

The problems of excavation are common to many branches of engineering and are treated of incidentally in numerous text-books and other volumes. Here, however, the author has drawn upon an experience of more than twenty years specialized in excavation work to give the subject comprehensive treatment. The result is one of the growing number of special treatises useful for reference. The author states specifically that his object is to help the engineer to choose the most suitable machinery for the work he has in hand.

Commencing with revolving shovels, the land types of excavators are described, the principles upon which they operate, and their special applications. A number of the newer types mounted upon caterpillars are included. Ditchers and "dry land dredges" are treated of fully. The various accessories such as buckets, engines, pumps, drills and the means of transportation, are treated separately. A chapter is devoted to hydraulic and hydraulic lifts. Dredges for the purposes of excavation and for placer mining are described comprehensively. While this book could not be used effectively as a text for teaching, and while its nature might make it difficult of comprehension to the young engineer, it will form a very useful work of reference for the engineer with whom excavation is an occasional, but necessary, employment.

The annual report of the State Mines, South Africa, for 1922 discloses the following facts: Over 8,000 natives are employed: 600,874 ounces of gold was won from 1,357,000 tons of ore, the working profit per ton being 18s. 10.8d. The sorting of waste from ore has increased the profit materially. The ore reserves are 10,324,000 tons.



# British Columbia Division, C. I. M. M.

REPORT OF THE SECRETARY FOR THE FISCAL  
YEAR ENDING APRIL 30th, 1923.

If the success of the largely attended meetings held under the auspices of the Division during the past year can be taken as a criterion of the interest of the members in the Division and its work, there is every reason for congratulation on this score. Indication of general interest has been manifest, moreover, in the proportionately large number of replies received to the questionnaires issued by the Secretary on various matters from time to time during the period under review. It must be admitted, however, that except in localities in immediate touch with Divisional Headquarters, such as Vancouver and the coal mining centres of Vancouver Island, and where conditions are exceptionally favourable for frequent and representative gatherings, apathy has still to be combatted. This was evidenced in particular at a meeting between members of the Executive Committee and Kootenay members following the International Mining Convention in Nelson in July last, when a proposal to organize a Kootenay Section with Branches in the Slocan and in East Kootenay, having in view the holding of regular annual meetings in the Interior as well as on the Coast, was rejected on the grounds that it would be impossible to stimulate interest sufficiently to maintain such an organization. But then, it should be noted, mining in the Kootenays was in a very depressed state, and with the improvement in the situation that has since taken place and the more optimistic feeling generally that has been engendered, it is hoped the inertia that prevented the entertainment of the project of a Kootenay section will be overcome. As a step towards that end it has been arranged that a General Divisional Meeting will be held in Trail next October, and Kootenay members have been urged in the interim to do their part to ensure a representative attendance, and incidentally to take advantage of the occasion to increase the membership in their section. Our problem in British Columbia as a Division, is the same problem that confronts the Institute as a whole—one of geography, and also of diversity of interest. Our mining centres are widely distributed and are separated by considerable distances. To travel from Stewart or Anyox, from Fernie or Kimberley, or even Rossland or Nelson to Vancouver, or from Vancouver to any of these points, is a lengthy procedure, occupying from three or four days to a week. It is likewise expensive. These are deterrents to communal intercourse and without such intercourse, without the establishment of a strong "esprit de corps," and without the binding power of a common and definite purpose or motive, the creation in outlying districts of a widespread interest in Institute affairs in any degree constant or permanent, has been found difficult.

## Establishment of Branches

In some instances the problem may be partly solved by the establishment of branches or "locals;" but the continued success or usefulness of a branch is dependent on several factors, the absence of any one of which is fatal. Primarily and fundamentally the success of a Branch depends on leadership. A Chairman or Secretary has to be found who is a public spirited and an untiring enthusiast with the capability of enthusing others. Such men are unhappily not common. It is almost equally as essential that such a Branch should afford an opportunity, not otherwise readily presented, for members to meet and inter-

change ideas on matters of direct and common interest to them.

The ideal condition is a camp of a number of mines of a similar character within easy reach of a common centre, and where, for example, differing methods of practice provide material for effective comparisons. A Branch, the members of which are mostly employees of one large corporation, and who in consequence are regularly thrown into one another's company, has less incentive to exist, although, in the case of the Anyox Branch, inspiring leadership was enough to overcome the handicap.

Meanwhile there appears to be excellent opportunity for the establishment of an active Branch at Stewart, or in the Portland Canal district, and preliminary steps have already been taken to that end.

The foregoing recital is sufficient to indicate the nature of the problems facing this Division, and a sustained effort has been made during the past year to cope with them.

## Division and Branch Meetings

The meetings held during the year by the Division, or under its auspices, have included the General Meeting in Vancouver in February 1922, the Western Meeting of the Institute in Vancouver in November of that year, and Branch Meetings at Rossland, Vancouver, Ladysmith, Nanaimo and Cumberland. Except during the three summer months, the Vancouver Branch met regularly at monthly luncheons throughout the year. Some of these luncheons were held in conjunction with the Mining Bureau of the Vancouver Board of Trade, and the B. C. Chamber of Mines.

The meetings have in every instance been characterized by large attendances, and by a keen interest displayed in the proceedings. The registered attendance at the Annual General Meeting of the Division was approximately three hundred, and no less a number were present at the General Western Meeting of the Institute, and included representatives from the membership in every Province in the Dominion, as well as a number of distinguished mining engineers from the United States.

It should perhaps be noted that the arrangements for the Western Meeting, including the securing of papers, were undertaken and successfully carried out by a Committee of Vancouver members and that a sufficient sum of money was collected locally to defray all the expenses, which otherwise would have been a charge on the parent body.

Concerning the Branch Meetings, a specially satisfactory feature has been the establishment of sympathetic and friendly relationships between members engaged in coal mining on Vancouver Island and those associated with metal mining on the Mainland as a result of the arrangements for frequent joint meetings between the Vancouver Island Branch and the Vancouver Branch. At these meetings the Vancouver Island Branch has acted as host, in which capacity their kind hospitality and ability as entertainers has been most amply demonstrated.

## The Year's Work

Of public questions affecting mining with which the Division has concerned itself in the past year three may be mentioned, the desirability of the report on amendments



to the "Professional Engineers Act," provision to bring about the standardization of examinations throughout Canada of candidates for certificates of competency in connection with coal mine management, with a view to establishing a Dominion-wide validity for such certificates; and the desirability of recommending an increased tax on unworked Crown Granted mineral claims as a means of discouraging the speculative holding of mineral areas.

As stated in last year's report of the work of the Division, the views of the members on the "Professional Engineers Act" was invited by the issue of a questionnaire, the replies to which, indicating a considerable divergence of opinion, were submitted to a special committee, under the chairmanship of Col. Guy H. Kirkpatrick, appointed by the Divisional Executive to study the question and report their conclusions thereon. After holding several meetings this Committee presented a report intimating that in their judgment it would be inadvisable "to interfere with the Act at the present time or to amend it for at least a year or two," on the grounds that "so far it has not had time to have any effect one way or another," and, it is added, if later on it appears that any amendment would be beneficial, action can be taken by the Division accordingly. The Committee note also that as legislation of a similar character has either been adopted or is being introduced in other Provinces, that it would seem to be desirable for the Institute to endeavour to bring about the standardization of such legislation to the end that registration under the Act of one Province would carry with it the privilege of practising in any other Province without further formality. A reciprocal arrangement on like lines with the various States where similar Acts are in force is also recommended.

Measures to bring about the standardization of examinations for coal mine managers' certificates in Canada, preliminary to an inter-Provincial recognition of such certificates, has been referred to the General Council of the Institute for action, and is now receiving the attention of that body.

The desirability of recommending the imposition of a higher tax on unworked Crown Granted Mineral Claims has been the subject of correspondence between the Division and the Prospectors' Associations, which at present are unfavourable to the project in the belief that it is not in the interests of prospectors. As the essential purpose of the proposal is to benefit the legitimate prospector by forcing the release for exploration of considerable areas now held by speculators in the more accessible districts, it is hoped that as a result of further argument the support of these Associations will be secured.

### The Iron Ore Survey

Periodical meetings of the Administrative Committee were held during the year, at which action in the name of the Division was authorized on several matters of public importance. Thus the Division submitted a recommendation to the Canadian Department of Mines urging that a detailed geological survey of the iron deposits of the Province be at once undertaken, and other means adopted in co-operation with the Provincial Department of Mines to determine authoritatively the potential value and extent of these resources. The grounds for this recommendation were that although for many years past there has been much talk of the establishment of an iron and steel industry in this Province, the evidence of the existence of extensive bodies of merchantable iron in quantity is not sufficiently conclusive, and it was believed that in order to create genuine enquiry concerning the possibilities of utilizing commercially these resources, it was desirable to establish the basal fact that the resources existed. It is

gratifying to state that the Department of Mines promptly acted on the recommendation, which was most heartily endorsed by the Hon. W. Sloan, and it was agreed that a detailed survey of all known iron occurrences in the Provinces should be made by a geologist who has special experience in this class of investigation, and who subsequently spent the summer in the field.

Acting in consort with the parent body, the Division communicated with the Prime Minister, the Rt. Hon. MacKenzie King, upon the return of the present Government to power, strongly advocating that in the selection of a Minister to assume direction of the Dominion Department of Mines, due consideration be given to his qualifications effectively to serve the mining industry in this important capacity. The subsequent appointment of the Hon. Charles Stewart as Minister of Mines has given general satisfaction.

The Administrative Committee has also communicated freely with headquarters on Institute affairs, and its views have invariably received courteous consideration.

Under the arrangement, to which reference was made in the Division's report of last year, by which the Granby Mining, Smelting and Power Co. and the Crow's Nest Pass Coal Co. were good enough to agree to provide "instructional" employment, for a period of two years, to graduates in mining of the University of British Columbia, two graduates of the University were recommended for, and were duly given employment at, respectively, Anyox and Fernie, during the year.

In conclusion, it is but fitting that reference should be made to the great loss the Institute in general and the Division in particular has sustained in the death, in December last, of Mr. J. D. MacKenzie who, for two successive years was a member of the Administrative Committee of the Division. The enthusiasm, energy, and devotion that he brought to bear in this capacity were a constant inspiration to his colleagues; and the success of the meetings up to the time of his death, and the strong revival of interest in the Institute's work in British Columbia during the past two years, may be attributed very largely to him.

H. Mortimer-Lamb, Secretary.

### RATE OF DISTILLATION AFFECTS QUALITY OF SHALE OILS

Studies made at the oil shale laboratory of the Bureau of Mines, Boulder, Colorado, indicate that the changes in the quality of crude shale oils produced by varying the rate of distillation, may be due to (a) the temperature at which the decomposition took place, and (b) the extent to which the thermal reaction progressed. The temperature studies show conclusively that the oils produced in the slow rates of distillation are actually produced at much lower temperatures than the oils formed by rapid distillation.

The practical limits to which controlled cracking within the retort may be carried are not yet determined, but since time or temperature are such important factors in the production of good crude shale oils, it should be feasible in commercial retort design to balance size of retort and heating surface, rate of heat supply to the shale, size of shale particles, and rate of throughput, so that the most desirable rate of distillation, and subsequent thermal reactions, can be obtained. Thus, it should be possible to govern, within fairly wide limits, the qualities of the crude oils obtained, and thereby to produce crude oils of the most desirable properties for commercial needs.



## THE FREIGHT RATE ON ALBERTA COAL.

### Western Views of Sir Henry Thornton's offer

Coal mine operators and the business men of the Province of Alberta generally are disappointed that a greater reduction in freight rates has not been offered by Sir Henry Thornton, president of the Canadian National Railways, in order to permit the development of a market in Ontario for Alberta coals. One prominent Alberta operator is quoted as saying that the concession "will help some, but the rate of \$9.00 a ton is not low enough to open a market for continuous shipments during the summer months. For this we require a six dollar rate." It is pointed out that the present price at the pithead ranges from \$3.50 to 4.00 a ton and the delivery cost and retail profit from \$2.00 to \$2.50. With the \$9 freight added, the Toronto price would be from \$14.50 to \$15.00 a ton for Alberta coal, and this price, the Edmonton operators say, would not be sufficiently attractive to permit successful competition in the East, unless there is an abnormal situation such as might result from an Eastern strike and a consequent shortage.

J. Gouge, of the Western Canada Coal Operators' Association, states that the reduction does not go far enough. He says that it is hopeless to try to reach the Ontario market with a rate like that.

Commenting on Sir Henry's offer the *Edmonton Bulletin* says editorially:

"The \$12.70 rate on Alberta coal to Ontario is to be reduced to \$9.00 during the months of May, June and July for shipments in train-load lots. That is the announcement of Sir Henry Thornton to the chairman of the senate committee on fuel supply. That this announcement will be received with profound disappointment both in Alberta and Ontario goes without saying. High hopes were entertained in both the west and east that a rate enabling Alberta domestic coal to compete with the Pennsylvania anthracite in the province of Ontario would be granted.

"A nine dollar rate only during the months when the consumer does not want to buy coal cannot change the present situation for either producer or consumer in any material degree. It is quite possible that such a rate during the winter months after the close of navigation might be of some use. The demand for anthracite is outrunning the supply, the quality furnished the Canadian market is deteriorating, there are occasions of shortage, as during the greater part of last winter. When the consumer needs coal in winter the question of price is less important than the quality of the coal and the assurance that it will be supplied. The experiments recently made with Alberta coal in the eastern cities have proven its satisfactory character. But it is too much to expect that eastern consumers will stack up during early summer with Alberta coal at a price with which they know the Pennsylvania operator can compete if he will. During the months of January, February and March and from mid-December to mid-April, the householder needs coal for immediate use. If the Pennsylvania supply is short or the quality inferior the Ontario householder might buy Alberta coal at a price that would carry a nine dollar freight rate. But if he is asked to pay a nine dollar rate on coal that he won't need until four, five or six months hence, he can't be expected to do it.

"It is a little difficult to appreciate the application of Sir Henry's argument, that because of possible weather conditions the railway cannot haul at the nine dollar rate during the winter months. All other rates apply throughout the year, the railway taking chances on weather conditions. The fact is that the road has to be kept open in all weathers, and unless the circumstances are entirely exceptional the more traffic there is moving the easier it is to keep it moving.

"Sir Henry bespeaks the co-operation of coal operators and distributors with the railway company to 'achieve the common object'—presumably the use of Alberta domestic coal in Ontario. That is to say, he calls upon Alberta operators and Ontario dealers to cut costs and to forego profits in order to promote the Alberta-Ontario coal trade. This is very right and proper; but in this case as in many others it is 'After you, my dear Alphonse!' Operators and dealers will naturally ask: 'How much of a cut has the railway made in order to promote this very desirable trade?' An examination of the mileage and freight tariff sheets discloses the fact that the railway hauls wheat from Edmonton to Fort William at 26 cents per 100 pounds, or \$5.20 a ton; that figures out at 41.6 cents per ton per hundred miles, the rail distance being about 1,250 miles. It is practically 2,000 miles from Edmonton to Toronto. At the per ton mile rate charged on wheat to Fort William the rate on wheat to Toronto would be \$8.32 a ton, or 68 cents per ton less than the rate at which Sir Henry offers to haul coal under special conditions and as a special consideration. It will be observed that the rate quoted on wheat to Fort William is by the car, not by the train load, and is the same in mid-winter as in mid-summer. Also that the railways gave a very prompt and efficient service last fall, and both systems made more money than they had done for several years, showing that the rate was a winner, not a loser. The railway may or may not at present give the rate quoted between Fort William and Toronto, but if the rate makes money for them between Alberta points and Fort William it should equally be a money maker between Fort William and Toronto.

"It is an accepted principle in fixing railway rates that freight of low value per ton gets a lower rate than freight of a high value per ton. No. 2 northern wheat is quoted at Edmonton at 95 cents per bushel. At that rate a 40-ton car would carry a value in wheat of \$1,266.35. Domestic coal is worth, say, \$3.50 f.o.b. the mine, or \$140.00 per carload. Sir Henry's special concession on coal rates is that he proposes to charge \$27.20 per 40-ton car more on coal from Edmonton to Toronto (worth \$140 at Edmonton), than he is entitled to charge on a 40-ton car of wheat worth \$1,266 at Edmonton."

"Permissible explosives, mining equipment and apparatus approved prior to January 1, 1923," is the title of technical paper 333, just issued by the Bureau of Mines, Washington. It gives the brand names of 154 permissible explosives, and lists of approved appurtenances. The equipment and supplies listed consist of such things as breathing apparatus, coal cutting machines, electric drills, electric cap lamps, flame safety lamps, shot-firing units and storage-battery locomotives.



## ANGLO-AMERICAN FINANCIAL CO-OPERATION.

The dominant note of an outstanding address delivered to the Executive Council of the American Bankers' Association by Mr. F. C. Goodenough, the Chairman of Barclay's Bank, London, was that British and American interests are in many respects so essentially identical that some form of co-operation between the two countries in matters relating to Europe is ultimately inevitable, even though it may occasionally be delayed.

In considering this community of interests Mr. Goodenough instanced the question of foreign investments.

For some time past Britain has been an investing nation. The practice has not been adopted exclusively without reason, but the almost inevitable result of our position as an industrial nation, largely dependent upon our exports, for the maintenance of our own standards. We are thus faced with the alternatives of increasing our foreign investments and thus extending our exports, or of accepting payment at a risk of restricting exports and increasing our external imports. It has not so completely as Great Britain been forced to accept the first of these alternatives that it is certain that the accruing interests on our external investments was year by year re-invested and that, on balance, we took little or no immediate interest from our debtors on the capital loaned to them.

### Re-Investment Justified

At first sight it may appear to be difficult to justify such action, from the point of view of the prosperity of the country. But the reason of continued foreign investment has been gradually to develop fresh markets, to enlarge the productive capacity of the whole world, and to this extent to ensure a steady demand for our own goods, which more than anything else helped towards the expansion of our trade and maintained relatively steady employment for our people. It might be said that, although the whole world benefits from such a policy, it has been the one our immediate interest and we have certainly derived no direct benefit.

The United States is not so dependent upon foreign markets, but since the war her position has radically changed. Her economy is completely altered and her industrial organisation has been developed upon the basis of a favourable balance of trade. To this extent, her interests in foreign markets are similar to those of Great Britain. As creditor nations, neither country can remain indifferent to the conditions existing, if only for the reason that the value of their assets in foreign countries is affected. As exporting and creditor nations both countries are virtually compelled to invest largely abroad for, as Mr. Goodenough points out, "payments between nations can only be made in the following ways, that is to say, in goods, in services, in gold, or in securities. So far therefore as America is not prepared to accept payments in goods or services, or gold, she will of necessity follow the investments and maintaining such volume of trade as experience of Great Britain and other creditor nations and accept payment in securities.

"On the one hand, therefore, we continue to re-invest in whole or in part such payments as are made to her by foreign debtors, increasing her foreign in-

vestments and maintaining such a volume of trade as would afford her a surplus of visible exports. On the other hand she may avoid foreign investments, and as far as possible, accept payment in goods, or services, or gold, and in that case the position would be altered and there would be a surplus of visible imports."

### Co-operation Inevitable

These considerations are the basis of Mr. Goodenough's conclusion that ultimately some effective measure of financial co-operation will be forced upon the two countries, and he proceeds to develop his argument in its relation to the problem of European reconstruction and the difficult question of reparations. Co-operation does not entail united Governmental action, it has no necessary connection with politics, and it may be that it will take the form merely of a realization in each country that the question must and can be solved on strictly business lines.

Mr. Goodenough is reasonably optimistic of a settlement of what may be described as the political difficulties attending the question of reparations and he believes that it will not long be delayed. With this aspect of the question eliminated, the problem would become one of finance, the solution of which must be considered as a business proposition by investors in all countries. This section of his argument is summarized as follows:—

"I assume that an agreement will be reached in the matter of reparations, and I think that Great Britain and America, as the two great creditor countries of the World, can, by acting in co-operation upon commercial lines, carry the matter a long way towards a successful conclusion. I am, of course, aware that any proposition of this kind must be a sound business proposition, but it seems to me that the reconstruction of Europe and the general trade and prosperity of the World must depend upon finance, and if the people of Great Britain and America, as the creditor nations, are prepared to find it, they will at the same time serve their own individual and common interests.

### Germany to be Rescued

"The question then arises, are Great Britain and America, as a purely commercial proposition, likely to provide the necessary credit? I think that under certain circumstances, substantial sums would be provided by Great Britain. But will America do the same? She will decide what shall be her own policy, but I can unhesitatingly say that my personal opinion is that the commercial and investment interests of the United States will lead her to approach this problem from much the same point of view as Great Britain."

Mr. Goodenough believes that the initial sums required would not be excessive and that it would be possible for Germany to offer such security as would make her bonds acceptable in the investment market.

"I think German Reparation Bonds could be made attractive if the principle of the endorsed bond were accepted. I feel sure that to the investing public in Great Britain and America, in fact, throughout the world, a bond given by Germany, specifically secured by German assets and bearing also the endorsement of the recipient nation which had received it on ac-

count of reparations, would prove a marketable security, when once a reasonably satisfactory settlement is in sight."

There is one further point emphasized. It is not always realized how important a factor in establishing a business basis for a solution of the problem, the wide distribution of Reparation Bonds, among ordinary private investors, may be. By that means the ordinary business credit of the debtor country is indirectly, but none the less truly, concerned in the due fulfillment of the terms of the Government bonds. "Germany could not afford to default on a widely held bond issue, whatever she might do in regard to debts held directly by the Governments of her late enemies." Finally, there is the fact that Great Britain and America as great creditor and overseas trading nations would secure a substantial indirect benefit through taking part in these financial operations, inasmuch as they, by removing the present deadlock, would stimulate trade, promote peace and prosperity, and thus conserve and consolidate their overseas assets.

### The Effect of Debt Payments.

At the conclusion of his speech, Mr. Goodenough briefly considered the effect of the repayment of the British debt, more particularly from the point of view of its influence upon the possible restoration of a free gold market.

It is becoming probable that within a reasonable period the exchange value of sterling will once more return to its pre-war parity and, if the tendency of prices to rise in America continues, this return will be hastened.

But it does not necessarily follow that even with the pound at parity, London will be able to establish a free gold market. Much must depend upon the readjustments in foreign trade which may be entailed by the British payments to America. "The effect of the Fordney Tariff will probably be to discourage the shipment of such of our manufactured goods as may be likely to compete in America. It is probable, therefore, that these goods, instead of being shipped to the United States, will be shipped to British Colonies and other countries and will in effect be used to pay for shipments of goods which the United States will take from them." But increased exports to countries without adequate gold reserves would not enable this country to draw gold at need while our reserves would, with a free gold market, be subjected to depletion. Moreover, an effective gold standard demands a definite ratio between gold and currency and until "some definite, but steadily improving, minimum ratio is established between gold and currency, there is no certainty that a withdrawal of gold for export would, by restricting the currency in circulation, bring that contraction in credit and fall in prices which formerly served to check the outflow. It seems, therefore, that Great Britain, before establishing a free gold market, would have to adopt a ratio system, and even then would require to have experience as to whether the cross currents of international trade were being adjusted so as to enable the liability incurred towards America for payment of debt and the payments which will have to be made for food supplies and raw materials, to be met without an undue drain from America on gold reserves."

In the matter of gold reserves also, co-operation between America and Great Britain would undoubtedly benefit both countries and, however the various problems, both financial and industrial, are approached, it seems to be clear that the interests of America and Great Britain in foreign markets must be closely allied. — Monthly Review, Barclay's Bank.

### DETECTION OF CARBON MONOXIDE POISONING

Through investigations conducted by United States Government technologists, methods of detecting carbon monoxide, most insidious and deadly of poisonous gases, have been given. The Bureau of Mines has been conducting research work, with the result that means have been found by which it is possible to discover within three minutes the extent to which a person has been affected by carbon monoxide gas by dissolving in the blood. Formerly it took approximately from 24 to 48 hours before diagnosis could be made of such cases, either in hospitals or well-equipped laboratories with the services of a skilled organic chemist. The test is effected through a simple and inexpensive instrument that may be carried in the pocket and requires no special training for its operation.

Many human lives are expected to be saved by the general adoption of this means of determining gas poisoning, particularly in the mining industry. With this quick method of diagnosis it is possible promptly to institute the proper emergency treatment.

Carbon monoxide is the universal industrial poison gas and is found at mine explosions and fires, as a product of explosions, in the atmosphere round coke ovens, in coal gas, water gas, and producer-gas plants, as well as in the exhaust gases of automobile engines, from improperly constructed and operated kitchen gas ranges, and in smoke from burning buildings.

Because of the common occurrence of carbon monoxide poisoning, the new instrument for detecting the gas in the blood is expected to be in universal use among physicians in the near future. Symptoms of carbon monoxide poisoning consist of headache, dizziness, weakness in the legs, increased respiration, becoming irregular and depressed, finally resulting in collapse, unconsciousness and possibly death.

The symptoms, detection and treatment of carbon monoxide poisoning are described in an 11-page report, Serial No. 2476, just published by the Bureau of Mines, Washington, and available on request.

### INCREASED COPPER OUTPUT IN BELGIAN CONGO

The production of copper by the Union Minière du Haut Katanga in 1922 is estimated to reach about 42,000 metric tons, according to a circular issued by the Tanganyika Commission. The new blast furnace is being erected to produce 6,000 to 8,000 tons per annum, and will be working during 1923. Tests and designs are being prepared for the installation of a plant to produce 30,000 tons a year. This will form the first unit of the large plant that the Union Minière has in view.



# THE MINING DISTRICTS

BY THE JOURNAL'S CORRESPONDENTS.

## GOUDREAU

No. 1 shaft of the Goudreau Gold Mines Ltd. is near the 400-foot level. As soon as this level is reached a cross-cut will be run to tap the vein. Drifting on the vein at this level will be carried on to the same extent as on the 200-foot level. It is understood that plans for a mill will not be completed until conditions on the new level are known.

The Detroit-Goudreau Gold Development Co. have commenced drilling operations on their property south of Lochalsh Station. Several camps have been built and a fully equipped assay office erected. The present drilling program will consist of a row of holes cutting the shear zone at a depth of about 150 feet. Smith and Travers of Sudbury have the drilling contract.

Development work has been started on a property known as the "Lucky Eight," located about two miles east of the Magpie River in Township 29, Range 25. This property has been optioned from the owners by a syndicate under the leadership of G. L. Michael of Sault Ste. Marie.

Several promising properties are at present under option and everything points to a busy season in this camp north of Sault Ste. Marie.

## NORTHERN ONTARIO

**Cobalt** — The Continental Mines has made an important discovery of high-grade ore on the 925-foot level. In addition to high-grade, there is a considerable quantity of milling ore, and it looks as if this property were shortly to be numbered among the producers of the camp. The discovery is of considerable importance inasmuch as it is the greatest depth at which commercial ore has yet been found in the camp. Further north, on the same contact on the Violet property, La Rose has also run into high-grade at a depth of 635 feet in the new shaft. Arrangements have been made to mill the ore at the Mining Corporation's mill, and shipments have already commenced from the Violet and Princess properties.

The Beaver has commenced the work of unwatering the lower levels in order to permit development of the vein found at the 1,200 foot level. The old workings of the Beaver showed a very strong vein at this point, which carried a considerable amount of silver in places, and it is believed that closer to the contact the chances are excellent for striking ore. The unwatering will be done through the Temiskaming shaft in order not to interrupt the work being done on the Beaver. The lower levels of the Beaver and Temiskaming are connected, and the pumping can be done more advantageously through the Temiskaming shaft.

The Oxford-Cobalt is now drifting on a vein on the 150-foot level, in which at times erratic silver values have been found.

During the week ending May 18th, shipments from Cobalt consisted of 131,300 pounds of ore from the O'Brien and 84,100 pounds from the McKinley-Darragh.

McKinley-Darragh has commenced operation of its sand treatment plant, but the Dominion Reduction Company, which last year was treating Peterson Lake tailings, has decided not to operate this year.

**South Lorrain.** — Preparations are being made to commence work on the Lorrain Consolidated in South Lorrain. The property has one shaft down 240 feet. This will be continued to 350 feet. New equipment and supplies are being brought to the property and work should be commenced shortly.

The Hon. Howard Ferguson, at a recent political meeting, announced that, if he were successful in winning the election, a railway would be constructed from Cobalt to South Lorrain. This would have an important bearing on the future of that section, and would, in all probability, result in the milling ore being hauled to Cobalt for treatment. In a comparatively short time there will be a large excess of milling facilities in Cobalt, and with a reasonable freight rate, the ore can probably be hauled to Cobalt to advantage and treated in some of the Cobalt mills.

**Porcupine** — Shareholders of the Dome Mines had an attack of "heart failure" this week when the shares declined about \$10.00 a share. So far as the physical condition of the property is concerned, there appears to be no justification for such a movement, and although the stock made a comparatively quick recovery, a good many margin holders were shaken out. With labor troubles apparently settled and with sufficient power, the company appears to be in a position to make the largest output in its history. During the recent power shortage the ore broken in the mine was largely increased, and at the first of May was approximately 500,000 tons. The grade of the ore is being maintained around \$12.00 a ton and it is understood that since the first of the month the production is about \$15,000 a day.

The strike vote taken in Porcupine last week resulted in a comparatively small number of ballots being cast, and as a consequence no action was taken by the men. Although other meetings are being called it is doubtful if any trouble will result. While men are by no means plentiful, the McIntyre reports having a greater number of employees than at any time in its history.

Preliminary operations are being started on a number of properties in Porcupine. Preparations are being made to unwater the Ankerite, which has been closed since it was under option to the Coniagas. Surface work is being started on the Martin claim in the same vicinity, and the Rypan Gold Mines in Doloro Township are also doing some surface work. The Beaumont, which was formerly known as the North Davidson, is being unwatered and surface work is being commenced. The South Porcupine Gold Mines Syndicate, with properties near South Porcupine, is calling for tenders for several thousand feet of diamond-drilling.

**Des Quinze** — It is reported that the Des Quinze Power Company, which has been formed to develop the recently acquired power rights on the Quinze River, will shortly make a \$4,500,000 bond issue. The proceeds will be used to retire \$1,200,000 of outstanding bonds of the Northern Canada Power Company, which is one



of the companies guaranteeing the new bond issue. The balance will be used for the construction of the transmission line and the power development.

**Kirkland** — Production of the Teck-Hughes is at the rate of approximately \$90,000 a month, and underground developments indicate that this can be maintained.

At the Wright-Hargreaves, development is now proceeding on the 850 and 1,000-foot levels, which are the two new levels being opened up. The mill is treating between 200 and 225 tons a day, and production is at the rate of approximately \$75,000 a month.

Reports from the Montreal-Ontario state that the crosscut is only a short distance from the point where values were encountered in the diamond-drill hole. This property has had a chequered career, and the reports issued shortly after the reorganization do not appear to have been borne out. It is to be hoped that the new development will give better results; but it is felt that it would be much safer to wait before making any definite statement regarding future possibilities.

**Dome's Bill** — It is understood that no opposition is being encountered by the Bill now before the Dominion House of Commons, which provides for an amendment to the Companies' Act permitting mines and other companies with wasting assets to pay dividends out of profits, although the value of the net assets may be less than the par value of the issued capital. This bill is being sponsored by the Dome's Mines in order to permit them to carry out the proposed reorganization whereby the stock will be split up into shares of no par value for each of the present shares, which has a value of \$10.00 par. As soon as the Bill has been passed the Dome will proceed to effect the change, and an official states that in July the dividend rate will be doubled.

## BRITISH COLUMBIA

**C. I. M. & M. Meeting.** — Thos. Graham, general superintendent of the Canadian Collieries (D) Ltd., was elected chairman of the B. C. Division of the Canadian Institute of Mining and Metallurgy at the Annual Meeting held on the 14th inst. in Vancouver. He is succeeding F. W. Guernsey, who asked to be relieved of office and who was tendered a dinner on the occasion of his retirement. H. Mortimer Lamb, the secretary, in submitting his report suggested the establishment of a branch of the Institute at Stewart, Portland Canal district. Amendments to the Professional Engineers' Act of B. C. have been considered, but it was not thought well to touch that Act at present. The standardization of examinations for coal mine managers' certificates throughout the Dominion of Canada was a proposal that the parent body will be asked to act upon. High tribute was paid to the work and personality of the late J. D. MacKenzie, who was in charge of the Geological Survey Division in British Columbia, and officers were elected as follows: President, Thos. Graham; vice president for the Coast District, H. G. Nichols; vice president for the Coast Interior, M. E. Purcell, Rossland; secretary, H. Mortimer Lamb; administrative committee, S. S. Fowler, Col. J. E. Leckie, Dr. G. Hanson, Dr. W. L. Uglow, Henry Lee; general committee, C. P. Browning, C. M. Campbell, H. S. Munro, A. G. Langley, M. Y. Williams, H. P. Wilson, and P. B. Freeland.

**Coal vs. Fuel Oil.** — In addressing a recent meeting of the Vancouver branch of the Canadian Institute of Mining & Metallurgy, Mr. Thos. Graham, general superintendent of the Canadian Collieries (D) Ltd., uttered a warning against too great a use of fuel oil in British Columbia. This fuel comes from the United States, competes directly with the local coal mining industry, and its use creates an unnecessary exodus of local capital. The United States has reached the peak in fuel oil production and is herself an importer of oil. Lack of supplies to meet the demand now being developed would come in due course and then the neglected coal mines would be asked to step into the gap. It was impossible to double or treble coal production at a moment's notice and the consumers might find themselves without vital industrial and domestic requirements.

**Long Life for Premier Mine.** — Dr. George Hanson, of the Canadian Geological Survey, speaking to a joint meeting of the Canadian Institute of Mining & Metallurgy, the Mining Bureau of the Vancouver Board of Trade, and the B. C. Chamber of Mines, at Vancouver stated that the Premier Mine camp is good for production over an indefinite period. Thos. Graham presided and among those present were Dr. Victor Dolmage, recently appointed head of the Geological Survey in B. C., and W. A. Carlyle, formerly Provincial Mineralogist.

**Britannia Mill's Capacity.** — C. P. Browning, manager of the Britannia Mining & Smelting Co., states that 2,000 tons of ore are passing through the new Howe Sound concentrator every day.

**Gold Dredging in Yukon.** — Burrall & Baird Co., already have started gold dredging operations in the Klondyke Valley and two of the dredges of the New Northwest Corporation on Dominion Creek will open the season's work shortly. The Yukon Gold Co. is not commencing its dredging this year until July 1, but already water has been turned into the \$5,000,000 ditch that feeds the company's many hydraulic plants. Winter dumps of pay dirt are being washed.

**Gold Dredging in Yukon.** — The Burrall & Baird Co. mining man of Spokane, Wn., is reported to have taken an option on 69 gold quartz claims situated on the west of Hawk Inlet, Admiralty Island. Charles Williams, owner of the properties, is to have charge of development work.

**Coal Trade Slack.** — Coal production in British Columbia during April shows a marked falling off as compared with March, the decline amounting to 65,246 tons. The weakness of the market is reflected in the output of each of the three chief coal fields of the Province. At present there are no signs of improvement. All Vancouver Island mines are working half time and the crews of most are being reduced. The only exception to this is the East Wellington Coal Co., operated by J. Grant, which is included among the producers for the first time and which mined 1044 tons. The Canadian Collieries (D) Ltd. and the Western Fuel Corporation of Canada are the mines most affected in this field. The Crow's Nest seems to be facing the necessity of slowing down also, as production there has dropped from 79,509 to 56,651 tons.



The effect of the slump in trade has knocked about 6,000 tons off the Canadian Collieries output at Comox, 7,000 ton at Extension and over 1,000 at South Wellington. It has sent down the production of No. 1 Mine, Nanaimo, Western Fuel Corporation, by approximately 9,000 of the Reserve Mine some 10,000 tons; and of the Wakefield several hundred tons. It has curtailed the Chesley Colliery output, Granby Consolidated Mining & Smelting Co., about 2,000 tons and the Nanaimo Wellington Colliery some 4,000 tons while even the King & Foster Colliery, Nanaimo, shows several hundred tons less production for April than for March.

In the Nicola-Princeton District the Fleming Coal Co. appears to have definitely dropped out of the list of producers. The Middlesboro Collieries show a reduction of several hundred tons and the Coalmont Collieries mined about 2,000 tons less in April than in the previous month. The Princeton Coal & Land Co. is the only company in this field that has the distinction of showing an increase, although the improvement is not substantial.

Practically the same story applies to the Crow's Nest. The Coal Creek Collieries show a reduction of 7,391 tons; the Michel of 15,450 tons; and the Corbin Coal & Coke Co. has about the same production. Incidentally it may be said that the output of coke at Michel fell off in April by about 4,939 tons.

The outputs of the various districts for April were as follows:

|                                     | Tons    |
|-------------------------------------|---------|
| Vancouver Island . . . . .          | 115,628 |
| Nicola-Princeton District . . . . . | 18,275  |
| Crow's Nest Pass District . . . . . | 56,651  |
|                                     | 190,554 |

**Examinations for Certificates.** — Coal mine officials' examinations, as provided under the "Coal Mines Regulation Act" of British Columbia, will be held on the 29th, 30th, and 31st of May, at Merritt, Nanaimo, Cumberland, and Fernie. There will be candidates at each centre for either 1st, 2nd or 3rd Class Certificates or for all three papers, while a number will offer themselves for mine surveyor's papers. The writing will be done under the supervision of the Mine Inspectors of the districts named.

**Princeton Colliery Reported Sold.** — F. W. Glover, who has been superintendent of the collieries of the Princeton Coal & Land Co., Nicola-Princeton District, has been appointed general manager. It is reported that the coal property has been taken over by English interests, that the measures are to be developed more intensively than heretofore, and that production shortly will be materially increased.

**Coal Bunkers for Vancouver Proposed.** — The installation of coal bunkers on the waterfront of the harbor of Vancouver is proposed by a coal mining company of the Province of Alberta, the intention being to make a bid for the mercantile requirements of that growing Pacific Coast port.

A placer gold mining scheme now contemplated in the Central Otago province of New Zealand provides for baring the bottom of the Karavan River, from which much placer gold has already been won.

## FLOURSPAR IN THE UNITED STATES IN 1922

The United States Geological Survey, reports that the domestic fluorspar-mining industry showed considerable improvement during 1922, recovering from the severe slump of 1921. The improvement was due principally to a larger demand for fluorspar of fluxing grade in the steel industry, which took about 86 per cent of the mineral shipped in 1922.

The producers of about 70 per cent of the basic open-hearth steel made reported that they consumed 72,962 short tons of fluorspar in 1922 and had stocks on hand amounting to 45,637 short tons on January 1, 1923. If the steel companies that did not report consumed a like proportion of fluorspar, the figures given indicate a total consumption in all steel plants of about 104,000 tons in 1922 and total stocks of about 65,000 tons on hand January 1, 1923.

The production during 1922 was 139,700 short tons, valued at \$2,505,000, or \$17.93 per ton. In 1921 it was 34,960 tons, valued at \$724,094, or \$20.71 per ton. Of this the steel companies took by far the larger part, 120,800 tons; glass and enamel factories, 8,700 tons (valued at \$36.49 per ton); hydrofluoric acid manufacturers, 4,800 tons; and foundries, 2,900 tons. The years' imports were 33,108 tons of an average value of \$9.04, of which Canada provided 2,877 tons.

## SOURCES OF PROFIT IN OIL SHALE INDUSTRY.

The probable sources of profit in the oil shale industry, according to Martin J. Gavin, refinery engineer of the United States Bureau of Mines, in the Bulletin 210, recently issued, are crude oil or its products, which ultimately are expected to be motor fuels, burning oils, gas and fuel oils, lubricants, paraffin wax, nitrogen compounds derived from oil, shale gas (which may be an indirect source of profit by reducing fuel costs, as also may refinery sludges if burned under stills), and possibly ammonium sulphate, or similar ammonia salts. There may also be important by-products and specialties, but, as yet, it is not safe to calculate on them.

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THOS. W. GIBSON,  
Deputy Minister of Mines.

Toronto, 12th March, 1923

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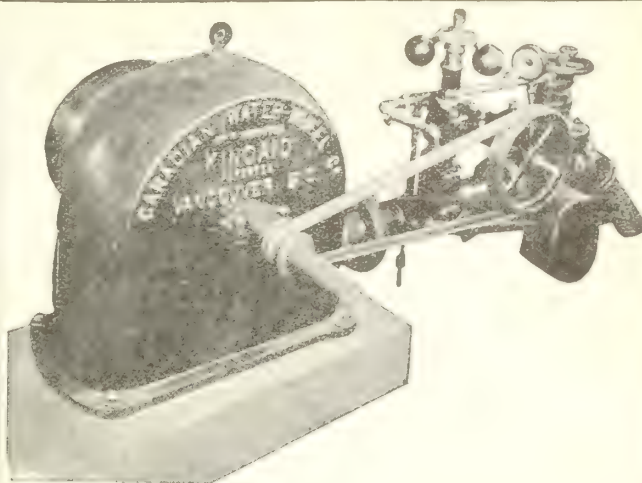
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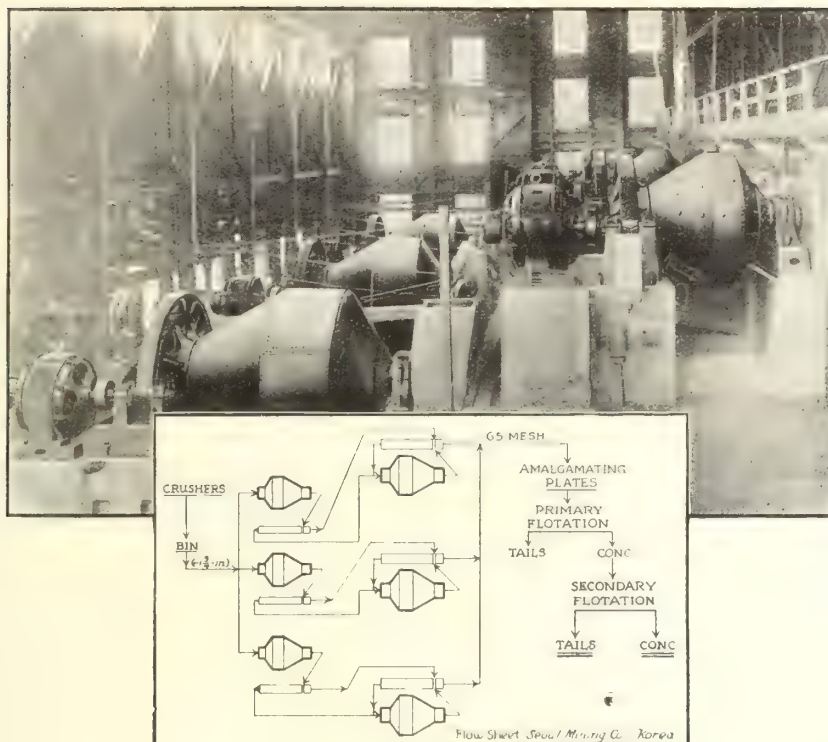


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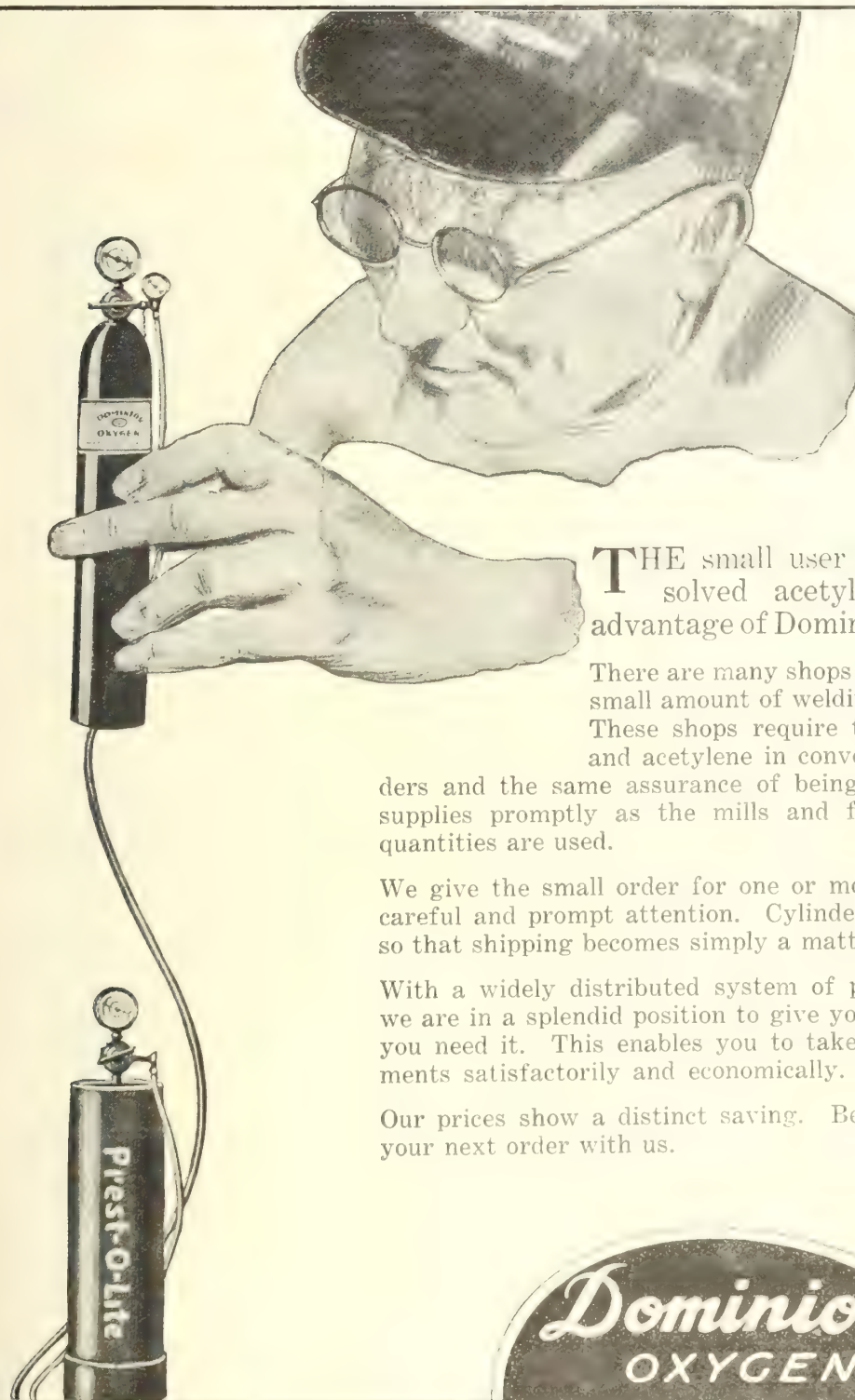
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Hon. H. MILLS, Minister of Mines

## Mineral Areas.

Ontario, with its 407,262 square miles, contains many millions of acres in which the geological formations are favorable for the occurrence of minerals, 70 per cent of the area being underlain by rocks of pre-Cambrian age. The phenomenally rich silver mines of Cobalt occur in these rocks; so also do the far-famed nickel-copper deposits of Sudbury, the gold of Porcupine and Kirkland Lake, and the iron ore of Magpie and Moose Mountain mines.

## Economic Minerals.

In addition to the above, practically all economic minerals (coal and tin excepted) are found in Ontario:—actinolite, apatite, arsenic, asbestos, cobalt, corundum, feldspar, fluor-spar, graphite, gypsum, iron pyrites, lead, mica, molybdenite, natural gas, palladium, petroleum, platinum, quartz, salt, talc and zinc. This Province has the largest deposits on the continent of talc, feldspar, mica and graphite.

Building materials, such as ornamental marble, limestone, sandstone, granite, trap, sand and gravel, lime, Portland cement, brick and tile, meet every demand.

## Mineral Production.

Preliminary returns show the output of the mines and metallurgical works of the Province for the year 1921 to be worth \$48,128,387, of which the metallic production was \$27,574,202.

The following figures show the rapid growth of Ontario's mineral industry by five-year periods since 1891:

| Year.        | Value.      | Year.        | Value.       |
|--------------|-------------|--------------|--------------|
| 1891 .. .. . | \$4,705,672 | 1906 .. .. . | \$22,388,383 |
| 1896 .. .. . | 5,235,003   | 1911 .. .. . | 41,976,797   |
| 1901 .. .. . | 11,831,086  | 1916 .. .. . | 65,303,822   |

## Dividends.

Dividends and bonuses paid to the end of 1921 amounted to \$23,140,734 for gold mining companies, and \$84,388,185 for silver mining companies or a total of \$107,528,919.

## Mining Regulations.

A miner's license costs \$5.00 per annum, and entitles the holder to stake out in any or every mining division three claims of 40 acres each. After performing 200 days' assessment work on a claim, patent may be obtained from the Crown on payment of \$2.50 or \$3.00 per acre, depending on location in unsurveyed or surveyed territory.

## Assay Office.

The Provincial Assay Office at No. 5 Queen's Park, Toronto, is maintained by the Department of Mines for the free identification of minerals, free assays under the provisions of the Mining Act of Ontario, and also for general assay work as per the Schedule of Charges which may be obtained on application.

## Temiskaming Testing Laboratories

The Department maintains, at Cobalt, an ore sampling and testing laboratory which is now prepared to receive parcels of gold ore from 100 pounds upward, and after sampling and assaying the same to pay to the shipper the value thereof, less treatment charges. The purpose is to afford a market for ores extracted by prospectors and others in developing their mining claims, enabling them to obtain funds which they can use for further work and to report on the most satisfactory method of treatment. Fuller information may be obtained on application to the Manager, Temiskaming Testing Laboratories, Cobalt, Ontario.

## Publications.

For list of publications, illustrated reports, geological maps and mining laws, apply to

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## DEPARTMENT OF MINES

HON. CHARLES STEWART, *Minister*

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### MINES BRANCH

#### Recent Publications

**Phosphate in Canada**, by H. S. Spence.  
The Preparation, Transportation and Combustion of Powdered Coal, by John Blizard.

**Road Materials along the St. Lawrence River**, from Quebec Boundary to Cardinal, Ont., by R. H. Picher.

**Building and Ornamental Stones of Canada** (British Columbia.) Vol. V., by W. A. Parks, Ph. D.

**Barium and Strontium in Canada**, by H. S. Spence.  
The Coalfields and Coal Industry of Eastern Canada, by F. W. Gray.

**The Value of Peat Fuel for the Generation of Steam**, by J. Blizard, B. Sc.

**Analyses of Canadian Fuels**. Parts I to V, by E. Stanfield M. Sc., and J. H. H. Nicolls, M. Sc.

**Graphite** by H. S. Spence.

**Gas Producer Trials with Alberta Coals**, by J. Blizard and E. S. Malloch.

**Summary Report of the Mines Branch, 1920.**

The Mines Branch maintains the following laboratories in which investigations are made with a view to assisting in the development of the general mining industry of Canada:—

**Fuel Testing Laboratory.**—Testing value of Canadian fuels for steam raising and production of power gas; analyses, and other chemical and physical examinations of solid, liquid and gaseous fuels are also made.

**Ore-Dressing Laboratory.**—Testing of Canadian ores and minerals, to ascertain most economical methods of treatment.

**Chemical Laboratory.**—Analysing and assaying of all mineral substances and their manufactured products. Copies of schedules of fees, which are slightly in excess of those charged by private practitioners, may be had on application.

**Ceramic Laboratory.**—Equipment is such that complete physical tests on clays and shales of the Dominion can be made, to determine their value from an economic standpoint.

**Structural Materials Laboratory.**—Experimental work on sands, cements and limes is also undertaken.

**Applications for reports and particulars** relative to having investigations made in the several laboratories should be addressed to **The Director, Mines Branch, Department of Mines, Ottawa.**

**Summary Report.** The annual Summary Report of the Geological Survey is now printed in parts. Applicants should, therefore, state what particular geological report is required, or what subject they are interested in.

**Memoir 108.** The Mackenzie River Basin, by Charles Camsell and Wyatt Malcolm.

### GEOLOGICAL SURVEY

#### Recent Publications

**Memoir 119.** The Reed-Wekusko Map-Area, Northern Manitoba, by F. J. Alcock.

**Memoir 121.** The Malagash Salt Deposit, Cumberland County, N. S., by A. O. Hayes.

**Memoir 123.** Sixty-mile and Ladue Rivers Area, Yukon, by W. E. Cockfield.

**Memoir 125.** Sedimentation of the Fraser River delta, by W. A. Johnston.

**Memoir 127.** Beauceville map-area, Quebec, by B. R. MacKay.

**Memoir 128.** Winnipegosis and Upper Whitemouth River areas, Manitoba, Pleistocene and Recent deposits, by W. A. Johnston.

**Memoir 130.** Geology and mineral deposits of the Bridge River map-area, British Columbia, by W. S. McCann.

**Memoir 131.** Kenogami, Round and Larder Lake areas, Timiskaming district, Ontario, by H. C. Cooke.

**Map 1585.** Mackenzie River basin, 1922 edition. Geology.

**Map 1751.** Wainwright, Alberta. Topography.

**Map 1752.** Monitor, Alberta and Saskatchewan. Topography.

**Map 1754.** Upper Elk and Highwood rivers, British Columbia and Alberta. Topography.

**Map 1829.** Salmon River area, Portland Canal mining division, B. C. Geology.

**Map 1831.** Vegreville; townships 47 to 55, ranges 11 to 10 west of the 4th meridian, Alberta. Topography.

**Map 1835.** Beauceville, Beauce county, Quebec. Geology.

**Map 1836.** Explored routes in a belt traversed by the Canadian National Railways between Longlac and Nipigon, Ontario. Geology.

**Map 1860.** Keno Hill area, Mayo district, Yukon. Geology.

**Map 1882.** Bridge River, B. C. Geology.

**Map 1901.** Upper Kitsault valley, B. C. Geology.

**Map 1948.** Wanspittel Lake area, Ont. Geology.

Applicants for publications not listed above should mention the precise area concerning which information is desired.

The Geological Survey will, under certain limitations, give information and advice upon subjects relating to general and economic geology. Mineral and rock specimens, when accompanied by definite statements of localities, will be examined and their nature reported upon.

Communications should be addressed to **The Director, Geological Survey, Ottawa.**



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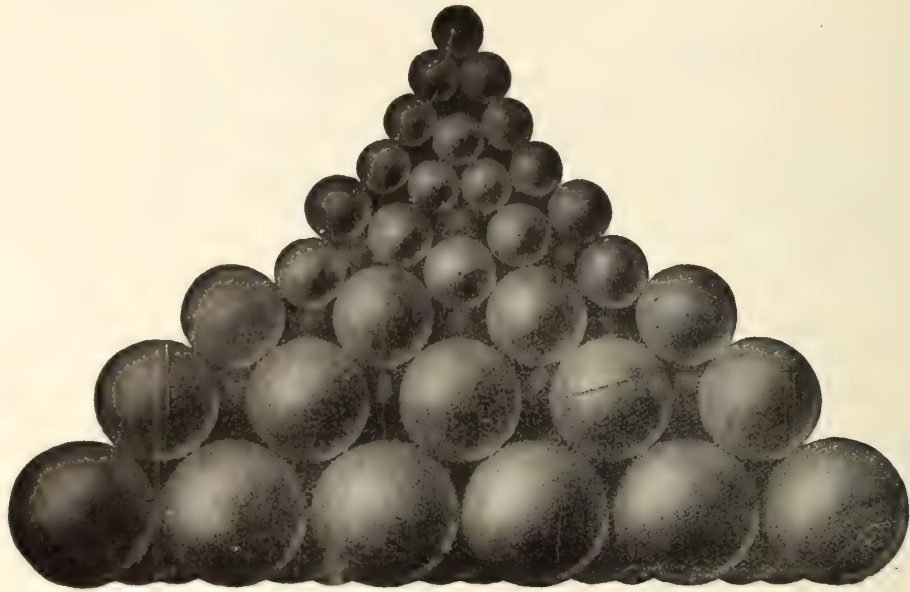
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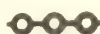
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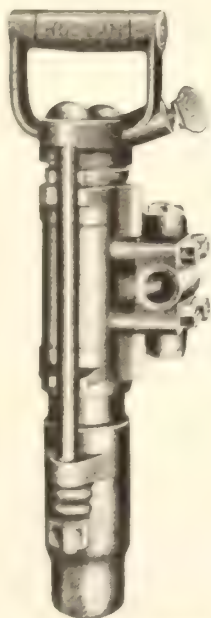
Since then the Imperial Bank's service has gradually extended until the mining interests in the rich area between North Bay and Hearst are now linked up by a complete chain of 12 branches.

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## :-: EDITORIAL :-:

### IS MAIN ISSUE BEING SIDE-TRACKED?

The interim report of the Dominion Fuel Board, dated April 25th and issued last week, is an excellent document. It is confessedly and obviously, and of necessity, incomplete; but it summarizes in a most admirably concise and clear way the fuel problem as it exists in the various parts of Canada, discussion of which has appeared in a more extended form in these pages during recent months.

Certain conclusions are possible at present, and the Fuel Board presents them, clearly and unequivocally. The danger of depending upon a single source of supply, in a foreign country, to such large extent as at present, is obvious, and we must use Nova Scotia coal, Alberta coal, Welsh anthracite, peat and wood to the fullest advantage, as well as replacing the use of coal by hydro-electric energy to the utmost. All these points are well brought out in the report; but it commits what we consider to be a very serious error of judgment. This error will, no doubt, be corrected in the subsequent and final reports, unless the interests whom we suspect to be hard at work in an endeavour to sway the judgment and influence the decision of the Fuel Board should succeed in their attempt.

The second of the well chosen and cleverly executed charts accompanying the report shows the coal reserves of Canada. All but a tiny fraction are in Alberta. This constitutes the heart of our problem, and try as we may, we cannot make the transportation of this coal to the east any other than the principal problem to be solved. The manufacture of peat fuel, the provision of coke for domestic use, economies in the household use of fuel, all are important; but all sink into insignificance beside the filling of Ontario's coal bins from the mines of Alberta.

It is the failure to emphasize this vital problem sufficiently that we criticise in this interim report. It does not direct the attention of the public to the single point on which most attention should be focussed. It preserves a fine impartiality of judgment among the various phases of the question, while the thing that is needed most just now is that every ounce of energy available should be put into the main issue.

There are numerous well-entrenched interests that will leave no stone unturned to keep the fuel supply of central Canada in its present channels. This is perfectly natural, and insofar as it is an honest attempt to protect personal interests, it is legitimate. It

is not in the national interest, however, that any such personal interests should be allowed to interfere unduly with our decision, and the public should be warned of the danger involved in losing sight of the main issue, in favour of issues of much less importance.

The hauling of Alberta coal to Ontario will, in all likelihood, remain the crux of Canada's fuel problem so long as Canada is a political entity and coal remains the principal source of heat for domestic and industrial use. We have not yet tackled seriously this transportation question. Sir Henry Thornton's offer of \$9.00 a ton, without the requisite facilities for cheap handling or hauling of the coal, is the merest temporary expedient — nothing more than a stop-gap. Mr. M. J. Butler has made a more business-like proposal.

The main issue in the fuel problem must not be side-tracked.

### MAPS OF QUEBEC GOLD AREA READY

The two new map-sheets of the Rouyn gold district of northwestern Quebec have been received by the Geological Survey from the printer, and the accompanying reports by H. C. Cooke and W. F. James, which have been in the printer's hands for some weeks, should also be ready for distribution shortly. Map No. 1987, Duparquet Area, covers the area from the inter-provincial boundary eastward to Lake Dufault, a distance of twenty-four miles, and from Duparquet Lake to the middle of Dasserat Lake, a distance of seventeen miles from north to south. Map No. 1985, of Opasatika Area of like width, extends southward to the southern end of Opasatika Lake.

The geological features shown on these two maps will require careful study, with close attention to the respective legends, which are not identical. On the Opasatika map the conglomerate of the Temiskaming Series and syenite porphyry appear as practically the same blue colour, but are readily distinguished by the identifying numbers.

An outstanding feature is the care devoted to glacial geology, which is an item of the utmost importance to the prospector. Two varieties of stipple, both of them so light as not to obscure or confuse the other parts of the geology and topography, are used to indicate boulder clay, and bedded clay and sand, respectively. Thus for the first time the prospector has the benefit of a map that gives clearly this important geological



feature. For some time the Geological Survey has experimented with these stipples, and now has solved the problem satisfactorily.

These maps have been turned out with a promptitude that sets a record for the Geological Survey, and the geologists, draftsmen and printers who coöperated to speed up the ordinary process of publication are to be congratulated on the result.

### EMPIRE STATESMEN IN CONFERENCE

The Imperial Conference has been called for the 1st October next in London, and the Imperial Economic Conference will meet there at the same time. The need for personal touch and consultation between the heads of the various self-governing Dominions and the representatives of India has recently been growing more urgent. Questions have emerged during the past few months which, perhaps, can only be satisfactorily settled at a Conference of the Empire's statesmen. For example, the signature of the recent treaty with the United States by Canada's own representative alone and not in association with a representative of Great Britain has been regarded, whether rightly or otherwise, as opening up constitutional issues of some magnitude, as to which different interpretations obtain in different parts of the Empire. The forthcoming Conference should do something to clear the air on this as on some other matters.

There are other constitutional problems looming up on the horizon, and it is possible that, in their case also, the forthcoming Conference may make a substantial contribution to their solution. But we confess that, for our part, we regard the questions that must come before the Economic Conference as being second in importance to none. As a result of the war, Great Britain is confronted by an industrial, commercial and financial situation of a far from reassuring kind. In order to obtain the wherewithal to discharge her debt obligations to the United States and also to keep her present population so employed as to support them on a reasonable standard of living, it is imperative for her — to a degree that it has never been before — to find an outlet for her manufactured products. Where is she to find this outlet? That is a question that must come before the forthcoming Economic Conference in a vitally urgent form. For with it is interwoven the question of Great Britain's commercial future and even of her political future as the source and centre of the Empire. For the latter is, and must necessarily be, dependent on the former and on her ability to support her population.

It must be remembered that, of Great Britain's export trade just prior to the war, something like two fifths went to European countries, and of this Germany absorbed about a quarter. Revival of her trade with Germany is unattainable until the reparations question is settled. Indeed, revival of her European

trade at large, on any scale commensurate with her necessities, is almost out of the question until foreign budgets are balanced and foreign currencies stabilized. It is obvious that, as things are at present, Russia must be disregarded from the standpoint of British trade, while, in any case, Germany is more advantageously situated than Great Britain for profiting by any trade openings that may offer in that country. Outside Europe, Japan is both increasing her exports to China at the expense of Great Britain and also taking a leading part in the development of Chinese natural resources. On this continent, the United States tariff must serve increasingly to exclude from the markets of that country even such manufactured products as Great Britain can still produce in competition with American industry. As far as Central and South America are concerned, the United States is now largely in possession of that market as a result of the war which shut off British exports therefrom.

This being so, Great Britain must look for her markets within the Empire. Most of her raw materials and foodstuffs can be supplied within that Empire's wide bounds, and, in view of her war debt to the United States and that country's tariff barrier against exports from other lands, it is to her undoubted interest to draw her supplies from the British Dominions. In India and in Africa, in particular, there are great potentialities for British trade. And, as regards the other British Dominions, while, it is true, each, possessed, as it is, of complete tariff autonomy, is naturally striving to develop its own manufacturing industries, yet each also is under the necessity of importing products from outside its borders. In such circumstances, it should not be beyond the competency of Empire statesmanship to devise some well-considered plan whereby inter-Imperial trade may be fostered and developed. So far as Canada is concerned, apart from any high Imperial grounds, there is every reason why we should restrict our purchases from other countries and buy instead from Great Britain — a customer that buys so much from us in the present and is sure to buy increasingly from us in the future.

It is because the subject of closer Empire trade is bound to be canvassed at the forthcoming Economic Conference with unprecedented concentration that we attach such importance to the meeting of that body next October. The objective at which we should aim is for every Empire citizen to purchase Empire-made goods. The manner of attaining that objective need not be discussed here and now. But the urgency of Great Britain's economic situation will doubtless be made fully apparent at the deliberations next October.

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Australia is ruled by a Labour government, and is enjoying the unsettled conditions naturally consequent upon such rule. The extremist Opposition is



socialistically inclined, or "red". A contemporary writer in Melbourne remarks that this "is the difference between tweedle-dum and tweedle-dee, for everyone knows that what extremists desire is power like that of Lenin and Trotsky, while the other party are only envious of the possessions of others. Our sister dominion is learning by hard experience the result of putting political control in the hands of leaders whose guiding ideas consist of untried theories instead of the well-tried principles that naturally form the basis of British governmental practice. The present troubles of Australia may well constitute a warning to us Canadians, lest we similarly lose sight of so valuable a part of the British tradition.

### SPIRITS OF STAG BAY

On rock-ribbed shores the ocean roars,  
The wind blows cold and dreary;  
Beneath a tent, a wanderer spent,  
Worn out, and over-weary,  
Reclines his length, devoid of strength,  
And low emits this query:—  
"Why came I to this country bleak and froze?  
"Why came I here to barren Labrador?  
"Why hearkened I to mister Bellew's bull?  
"And why did I my freight so quickly pull"  
"By mosquitoes I've been stung  
"And my withers they are wrung;  
"But the sting I got in good old Montreal  
"Was the sting that really hurt,  
"Was the touch that did me dirt,  
"Yes, the sting that I was stung in Montreal."

#### Spirit of Labrador:—

"Who seeks his fortune in my hostile waste  
"Must of disaster and distresses taste."

#### Spirit of Bellew (by radio):—

"I still have forty acres to be sold.  
"These acres promise bucketsful of gold.  
"Co-operate a little while with me,  
"And you shall see exactly what you'll see."

#### Spirits of St. John's and Sydney:—

"A murrain on the critic and the crab!  
"A blessing on bold Bellew and his grab!  
"For our boats they all are chartered,  
"And our merchandise is bartered,  
"And the gold pours in like blazes ere it reaches  
Labrador,—  
"Ere it reaches Labrador, where the winds are keen  
and froze—  
"We have prospered more this season than we ever  
did before."

#### Spirits of Co-Operative Investors:—

"We saw it in the papers, boldly printed;  
"Neither figures, facts, nor glowing hopes were  
stinted.

"Though a few pale protests rose,  
"Bellew led us by the nose:  
"And our money we have lost it,  
"Just as much as if we'd tossed it  
"In the waves that lave the shore,  
"Rock-bound shore, of Labrador."

#### Spirit of the Canadian Mining Journal:—

"Weep no more these briny tears and salt:  
"We told you so, it's all your own darned fault!"

#### Spirit of the Geological Survey:—

"This woe, these lamentations, are misspent;  
"We warned you wisely,—after the event."

#### Spirit of Administrative Justice:—

"Too bad these culprits have got clean away:  
"Should this recur, then they will rue the day!"

#### Spirits of Daily Newspapers:—

"They paid us for advertisements, you know;  
"We took the cash and let the credit go."

\* \* \*

On rock-ribbed shores the ocean roars—  
It is the old, old, story.  
Oppressed by flies, the wanderer dies;  
His soul goes on to glory.  
But, ere he dies, "Eheu!" he cries,  
"To think of my forgetting  
"That no place more than Labrador  
"Demands mosquito-netting!"

J. C. M.

### THE KENO HILL MINES

The results of the winter's campaign of ore transportation from the silver-lead mines of Keno Hill, Yukon Territory, are recorded in a recent issue of the *Dawson Weekly News*. The allied companies, Keno Hill, Ltd., and Yukon Gold, have hauled out 5,000 tons of ore to the Stewart River at Mayo, while the Treadwell Yukon Company has brought out 4,000 tons with its caterpillar tractors. Smaller shippers are the Shamrock claim, 100 tons; the Gamble claim, 50 tons; and the Gold Queen claim, 13 tons, all of high-grade ore.

There is now a producing mine on the McQuesten or western slope of Keno Hill. On the Sadie claim of the Yukon Gold Company a new shaft has opened up a promising shoot of very rich ore, mostly composed of grey copper. The vein is said to be a continuation of the Treadwell Yukon vein.

The developed ore of the Keno Hill, Ltd., vein has been stoped out during the winter, and a crew of miners are now at work developing a supply for shipment during the coming winter. Development of the Treadwell Yukon has been in progress during the winter, and ore of remarkably high grade is reported to have been opened up, particularly on the 300-foot level, where ruby silver is abundant.

It is estimated that 20,000 tons of ore will be shipped from the Keno Hill mines next winter, and that, due to improved transportation facilities, it will be profitable to ship ore of a lower grade than at present.



# LETTERS FROM SOUTH LORRAIN

## II PERSONAL AND GENERAL

NOTE — In the first of these letters, June 1st issue C.M.J. the third last paragraph should read: — "I doubt if more than two or three mining men in the North and otherwheres believed until quite recently that Dr. Bell's judgment would be vindicated. South Lorrain in general, and the Keeley mine in particular, were regarded not as merely moribund, but as dead, etc."

Times have changed profoundly since the early days of Cobalt, and changed for the better. The restrictive geological thought of those days has largely disappeared. It may be for the ultimate good of all concerned that South Lorrain's development was postponed until now. That the district will be opened up rapidly is certain. The two (and there are only two) producing companies have large acreages under option or under purchase agreement. The Huronian Belt Company, which holds a preponderating interest in the Keeley, is opening up the Maidens property, lying to the east near the shores of Lake Temiskaming. The claims have definite promise. The Mining Corporation has a large group of contiguous claims forming a solid block surrounding the Frontier mine. Both companies are planning comprehensive campaigns of sinking, underground exploration, and diamond-drilling. Other companies, syndicates, and individuals, are bringing in equipment for systematic work.

The other side of the shield is represented by one widely advertised property, on which no work was being done at the time of my visit, and which has absolutely nothing to recommend it save the indeterminate possibilities of location. I refer to the Lorrain Consolidated. This concern runs a very fair chance of giving a black eye to the district generally. The promoters seem to be doing their best to trade on the established reputations of the producers, and in doing so to discount the future of their own property to a dangerous degree. This is mischievous and superfluous.

In the main, however, the spirit animating South Lorrain is sound. The camp is reaping the full benefits of cumulative experience, hard won in Cobalt, and of extraordinarily improved mechanical equipment.

When it is borne in mind that the Frontier has shipped this year high-grade ore containing about 750,000 ounces of silver; that the Keeley is producing about 140,000 ounces of silver per month, will soon largely increase (possibly double) this amount, and is adding more to its reserves than is being taken out of the mine; that more than a score of new possible producers will be opened up this summer,—it is hard indeed to understand the lassitude of the Provincial Government in the matter of road-building. The road from North Cobalt to Silver Centre, 118 miles, was bad enough when the writer drove in to the latter place; but it was incomparably worse on the way out. Two wet days had converted it into an almost continuous quagmire. Desultory attempts to mend matters were being made by Government road-gangs, — with the usual result. With Cobalt, North Cobalt, and much-afflicted Haileybury depending for their continued existence on the growth of mining in South Lorrain, it seems wonderfully short-

sighted on the part of the Government not to act with vigor and despatch.

However, abusing governments is too common an indoor sport to be particularly interesting. My earnest wish is that the Premier and his entire cabinet should be driven over this *via dolorosa* in a seatless express wagon, on a rainy day.

\* \* \*

That best of all breeds, — now, now, let us moderate our transports! — that peer of any breed, the Bluenose, is well represented in South Lorrain. Even that pseudo-Bluenose, the Cape Bretoner, answer the roll-call. The Nova Scotian plays a part in mining communities comparable to the part played by vitamins in modern dietaries. Therefore he may appositely be called the "vitaminer," Modesty forbids us to pursue the subject farther.

\* \* \*

With incomplete and partly improvised equipment, most creditable results have been obtained at the Keeley mill. The mill superintendent, Mr. M. R. O'Shaughnessy, (a Bluenose), has had long and varied experience in handling recalcitrant mills and obstinate ores. The task of concentrating oxidised silver ores of very variable metallic tenor, along with unoxidised ores is neither simple or easy. To achieve a recovery averaging about 90% on this class of milling ore is something to be proud of.

\* \* \*

From experience up to the present a few generalizations can be drawn as to the character of the known veins and vein systems. The Woods vein, which is the central — though not necessarily the most important — feature of the vein systems of the Frontier and the Keeley, has a general north and south strike. In a paper read before the Institution of Mining and Metallurgy, London, Dr. Bell states that this vein occupies a fault resembling that at Cobalt Lake, but that the Woods vein is stronger and shows much less "gouge". It is not anywhere exposed on the surface, but can be traced for the reason that it follows a narrow, low, swampy depression known locally as Woods Valley. The vein occupies a fractured zone, ten feet wide. Sometimes there are three, four, and even five feet of solid ore. Again the vein will be split into two or more stringers over a width of four or five feet. In these cases the fractured rock is usually impregnated with leaf and wire silver, or with fine argentite or ruby silver. But the Woods vein is exceptionally wide. The other known veins (and they are numerous) are usually not more than two to three feet wide, and often much less. The suite of metallic vein minerals is not markedly dissimilar to the vein minerals of Cobalt. The gangue in the unoxidised portions of the veins is also similar to that of Cobalt veins. It is made up most commonly of calcite, dolomite, and quartz. A pink, silicified carbonate is not uncommon. What is taken to be a healthy indication of high-grade ore is a dense, very dark, finely banded quartz and calcite, containing smaltite and, generally, fine native silver enclosed in the smaltite. The vein material in the oxidised zone is a highly decomposed, soft rusty material containing



# Natural Gas and Petroleum Resources of Western Canada

## 1—GENERAL CONDITIONS AND EXPLORATION

BY NEWTON W. EMMONS.

For the past few years, in fact ever since the close of the Great War, when we have been able to turn our attention to other things besides the saving of civilization, the petroleum industry, particularly that branch of it which deals with the discovery and development of new areas of supply has been much in the limelight, and our daily press has had a good deal to say on the subject, much of which is inaccurate to say the least.

Great stress has been laid upon the statement, emanating from varying sources, that the known resources of petroleum are being rapidly exhausted and that the end of the supply is in sight, even though such an event be placed several decades away; and it has been suggested that the time is not far distant when the motorist will have to depend upon some other fluid than gasoline to drive his car. There is no question that the production of oil in some fields is declining, that their present production is much smaller than a few years ago, and that their complete exhaustion is only a matter of a comparatively short time, notably the light-oil fields of Mexico (which have declined some 80% in the past two years), and some of the oil-fields in the Eastern United States. But these declines have been much more than offset by the greatly increased production from the newer fields in the States of Oklahoma, Wyoming, Montana, Texas and California. In this last State four new fields have been discovered during the past year, which have not only added tremendously to the immediate oil production but, from the great thickness of the sands, promise a long life. Added to this is the fact that in California deep drilling is now practised and wells are being successfully bored to depths of over 6,000 feet. (The Standard Oil Co., of California has just completed a well 6,680 feet deep,

which establishes a new record of depth for a rotary-drilled well). This adds over one thousand feet vertically of possible new productive ground to what has been previously developed, as it is now commercially profitable to penetrate to the deep sands. It is interesting to note, in this connection, that in California during the past year there was added to the oil storage capacity, tankage to the extent of 7,000,000 barrels, because there was no immediate market for the greatly increased production; and also that, according to the figures of the American Petroleum Institute, there was oil in storage on December 31st, 1922, to the extent of 61,184,928 barrels, (about 214,150,000 imperial gallons) with a daily production in December last of 565,000 barrels, to which could be added another 100,000 barrels at any time from wells belonging to the larger operators that were shut in, being held in reserve.

### U. S. Production and Reserves Increasing

In the first five months of the present year the California production of crude oil has been increased to about 700,000 barrels daily, at which figure it will probably be held for the very good reason that no facilities exist, nor can they be readily obtained, to take care of a greater output.

In addition to this increase of production in California, increases are also recorded in all the other producing fields of the United States with the exception of those of Indiana, Kentucky, Colorado, Tennessee and the coastal district of Texas, in which places there has been a falling off. The total crude oil in storage in the United States at the end of March last was, according to the figures of the United States Geological Survey, 258,026,000 barrels, since which time it has increased materially because the production is greatly in excess of the demand. To stimulate the demand, prices of crude oil have been reduced several times of late and there is every indication of their going lower. On May 14th the following prices per barrel of 42 U. S. gallons were quoted:—

|                 |                  |
|-----------------|------------------|
| California      | \$0.60 to \$1.04 |
| Wyoming         | 1.25 to 1.70     |
| Gulf Coast      | 1.30 to 1.75     |
| Mid-Continental | 1.10 to 2.20     |
| Central States  | 1.35 to 2.18     |
| Eastern Fields  | 1.00 to 3.25     |
| Sunburst, Mont. | 0.80             |
| Petrolia        | 2.58             |

The governing factors in arriving at the value of any given crude oil are the percentages of gasoline, naphtha, kerosene and lubricating oil contained in the crude and the cost of getting it to the refineries and market.

### Importance of Oil Production in Canada

It may be contended that the foregoing brief summary of the oil situation is of no particular interest to Canadians and has no bearing on the search for oil nor on the profits to be obtained from its discovery and exploitation. Such a contention is erroneous, for the reason that any oil discovered in Canada will have to com-

annabergite and erythrite near the surface. At greater depths these minerals become increasingly rare.

At the diabase-Keewatin contact there is little, if any, enrichment. The most persistent and spectacular shoots occur at varying distances from the contact, but relatively close to it. It is noteworthy that, with the exception of the Woods vein, the veins are found to carry ore more profitably when the dip is steep than when the dip flattens.

On neither the Frontier nor the Keeley has the intricate network of veins been more than incidentally explored. Underground prospecting demands experience, patience, ceaseless watchfulness, and, above all, courage and initiative. A considerable amount of "blind" work must be done because of the ever-present fear of missing something worth while. A visit underground at South Lorrain is at first eminently confusing. However, as one gets his bearings, it becomes intensely interesting to read the visible records of success and disappointment. Evidences of the latter are more numerous than evidences of the former, but success when it does come makes up an hundred-fold for all blanks drawn.

J. C. MURRAY

\* Petroleum Engineer, Vancouver, B. C.



pete in the open market with that of like grade produced on the other side of the line, particularly in view of the fact that the refineries are in the hands of the large oil companies and the prices are established by them, based on the demand for their refined products and the amount of suitable crude oil offered. The independent refiners, of whom there are a few, either own wells or pay the same prices as the big refiners.

The importance of the discovery of producing oil fields in Canada rests not so much upon a present lack of supply as it does upon having the source of supply within the Empire, because, in the event of war and the supply of crude oil, which Great Britain at present obtains from foreign countries, being cut off, she would then have resources of her own upon which to fall back. In time of war, as well as in time of peace, not only is crude oil of vital importance to the life of the nation and its commerce, but gasoline is even more so, as without this latter the operation of air-craft and motor transport would be most seriously handicapped. Many chemists are engaged in research work, the object of which is to obtain a greater yield of gasoline from crude oil, and many improvements have been made in the art of petroleum distillation within the past few years, that have accomplished much in this direction, particularly the "cracking" process by which the heavier hydrocarbons are broken up and re-grouped into lighter compounds by a molecular rearrangement.

### A Vast Field For Exploration

The attention of the geologist and petroleum engineer, in their search for petroleum-producing territory in Canada, has been directed to the great central plateau region lying to the east of the Rocky Mountains and extending from the United States boundary to the Arctic Ocean, because here are found not only similar strata, of the same geological age as those proven to be productive in the United States, but because of the existence of enormous deposits of bituminous sands that are clearly the residue of an extensive oil field from which the lighter hydrocarbons have evaporated. Unfortunately much of this territory, particularly north of latitude 56°, is extremely difficult of access, owing to lack of railways, or even roads, and the expense of thorough exploration and drilling is prohibitive to any but the financially powerful organizations that are now engaged in the work and to whose enterprise and perseverance great credit is due.

In spite of these handicaps, however, much work has been and is being done north of latitude 56°, with as yet inconclusive results. The existence of oil has been proved, even if the extent of the field and its productivity have not, and there is good reason to believe that commercial oil-fields will be developed in this part of the country even though it may take additional years of persistent effort and the expenditure of large sums of money.

### The Prospective Coutts Oil-Field

In the southern part of this territory, more particularly in southeastern Alberta, renewed interest is being taken because of the discovery in 1922 of an oil field twelve miles south of the International boundary in Toole County, Montana, known as the Kevin-Sunburst field, in which there are two proved oil-producing formations, one in the Kootenai (Dakota-Kootenay of Alberta) of Lower Cretaceous age, and the other in the Ellis of Upper Jurassic age. The structure in the Kevin-Sunburst field is that of a broad dome, superim-

posed on a northward plunging anticline that extends from south of Great Falls, Montana, for one hundred miles into Alberta, and the oil-field as at present outlined by drilling lies round the higher part of this dome, its northern limit being about ten miles south of the border. The wells are not deep, being from 1500 to 1,700 feet, and are not in the "gusher" class, recently completed wells giving from 30 to 50 barrels a day.

There is no reason to believe, however, that the accumulation of oil into commercial pools is confined to this Kevin-Sunburst dome or that similar structures do not occur along the same anticline in the Province of Alberta; but it is probable that the oil horizons are here at a considerably greater depth owing to the northward dip of the arch.

In 1918 the Grand Trunk Pacific Development Co. drilled a test well in Sec 1. Tp. 1., R. 12 W., 4th Meridian of Alberta, a short distance north of the Montana line, but got only a "show". This well was drilled to a depth of 2900 feet and passed completely through the Dakota-Kootenay and Jurassic formations that are productive in the Kevin-Sunburst field. From our present knowledge of the underlying rock structure in northern Montana and southern Alberta it is evident that this Grand Trunk well was located too far to the east. Several other tests were drilled in the Sweet Grass Hills country (southern Alberta) with negative results, but all were too far east to catch the northward continuation of the Sweetgrass arch (the name given to the anticline upon which the Kevin-Sunburst dome is superimposed), the axis of which, from the latest available data, will cross into the Province of Alberta to the west of the town of Coutts. Here several tests wells are now being drilled, the results of which are awaited with interest.

### The Productive Field at Okotox

In southwestern Alberta is situated the only field so far developed in Western Canada that has commercial oil production. This is the Okotox field, 35 miles south and a little west of Calgary, from which a high gravity oil is being produced. This field is described in detail in Memoir No. 122 of the Canadian Geological Survey, to which the reader is referred for complete information. It is interesting to note, however, that the oil and gas in this Okotox field comes from the same geological horizon as that which contains the upper producing sands of the Kevin-Sunburst field, namely the Dakota-Kootenay beds of the Lower Cretaceous.

In other parts of Alberta much drilling has been done in an endeavour to find oil in commercial quantities, but up to the present the results are not encouraging. Oil has been found in a number of these wells, it is true, but in no instance has it been in sufficient quantities to make its recovery profitable under present conditions of transportation, market, and high cost of operation. But the possible, I may safely say probable, oil-producing area is of such great extent and so much of it is remote from transportation that it will be many years yet before it can be definitely stated that there are, or are not, commercial oil-fields in western Canada.

### Great and Unrealized Importance of Gas Field

It must not be thought that all this searching and drilling for oil has been without important results, or that the money thus expended has been useless, because such is not the case. As a matter of fact the existence of some of the largest natural gas fields on the North American continent have been proved by this work, individual wells having "open flows" of from one to



thirty million cubic feet of gas per day. Some of this gas is "dry" but much of it contains gasoline that can be recovered and sold at handsome profit, and all of it will ultimately become a source of revenue; will be used for domestic and power purposes, or manufactured into products of commerce for which there is an existing market and increasingly active demand. This potential source of gasoline is of the greatest importance to the Dominion, second only to the finding of a great oil field; and, should the output be greater than can be absorbed by the domestic market, there is an export demand of no mean proportions; for example there was imported into the United Kingdom from the United States and Mexico for the week-ending April 9th, over two million gallons and the exports of gasoline from the United States amount to hundreds of millions of gallons per annum.

The subject of this natural gas, the extraction and recovery of its contained gasoline, and the utilization of the residue-gas will be dealt with in a second article.

### PERSONAL AND GENERAL

Dr. Oliver Bowles has been appointed superintendent of a new mining experiment station established by the United States Bureau of Mines at Rutgers College, New Brunswick, New Jersey. Dr. Bowles is a Canadian and graduated from University of Toronto in 1907. His specialty is non-metallic minerals.

Ontario's gold deposits were discussed at the meeting in New York last month of the Society of Economic Geologists, where Dr. W. G. Miller, Mr. C. W. Knight and Mr. P. E. Hopkins addressed the meeting on various phases of mining in Ontario and the geology of the mining districts.

Dr. John A. Allan, of the University of Alberta, is on a business trip to the East. He has already visited Ottawa and Montreal and is on his way further east.

Mr. Hugh McMillan, mine superintendent of the Keeley, on being transferred to the superintendency of operations at the Maidens property, was presented with a gold watch and chain by the Keeley employees.

Prof. S. H. Graham, who is associated with Mr. J. B. Tyrrell, has gone into the Rouyn gold field.

Mr. C. M. Odell, of the Dominion Coal Company, who returned recently after a trip through the Canadian West, has been promoting in Sydney the idea of closer coöperation between East and West.

Dr. J. Mackintosh Bell returned last week from the Rouyn gold district, where he inspected claims held by the Huronian Belt Company of London, of which he is the Canadian representative.

Mr. Clifford E. C. Smith is at the Ankerite property in Porcupine, which has been unwatered preparatory to a campaign of active development by a New York syndicate.

Mr G. P. Mackenzie, Dawson City, gold commissioner for the Yukon, has received instructions from Ottawa to establish a separate mining district round the Mayo silver camp. There is already a sub-recorder's office in Mayo, in charge of Mr. R. L. Gillespie.

Mr. James Harkness, one of the pioneers of South Lorrain and the owner of a number of claims there, has just returned from a business trip to Buffalo.

Mr. L. R. Clapps has been appointed resident manager for Granby Consolidated of the mine at Copper Mountain and the adjoining mill at Allenby, B.C.

Mr. David Brownlie has severed his connection with Messrs. Brownlie and Green, Ltd., of London and Manchester, and is now engaged in private practice at 46 Grange Road, Ealing, London, W. 5. He continues to specialise in the use of coal, particularly in its carbonisation.

Dr. J. Auster Bancroft, of McGill University, has arrived in Anyox to do special geological work for Granby Consolidated during the summer months. He will pay particular attention to the Sultana, Sunshine, George and Outsider Groups.

### MEETING OF SOCIETY OF ECONOMIC GEOLOGISTS

The Society of Economic Geologists held its first, what may be called independent, meeting in New York on May 18 and 19. This Society was organized a couple of years ago, but has heretofore held its meetings along with the Geological Society of America or with the American Institute of Mining and Metallurgical Engineers. The recent meeting was considered to be a great success, about fifty members being in attendance. It is likely that hereafter this Society will hold its annual meeting in May. The following representatives of Canada were present at the meeting, viz., W. G. Miller, C. W. Knight and P. E. Hopkins of the Ontario Department of Mines. There is room for specialized societies such as this in North America as owing to the large population on this continent, most scientific societies have become too large and unwieldy, and there is not a good opportunity for fraternizing and becoming acquainted in such a way as there is at the gatherings of smaller societies.

### NEW GRANBY PROPERTY

*The Granby News*, published at Anyox, B. C., reports that active exploration work will be commenced immediately by the Granby Company, according to the announcement of the General Manager, on the Sultana group of claims. This property is situated at Boulder Creek, ten miles from Seaton, which is about one hundred and twenty-five miles east of Prince Rupert. There were some six or eight claims originally comprised in this group, but this number has since been increased to fourteen. The ore is high grade carrying copper, silver and gold. Sampling across the sixteen foot ore body gave returns of sixteen ounces silver, three and a half per cent. copper, with gold values.

### NEW FELLOWS OF ROYAL SOCIETY OF CANADA

At the meeting of The Royal Society of Canada, held in Ottawa May 22-24, the following geologists were elected Fellows of the Society: A. G. Burrows of the Ontario Department of Mines; E. L. Bruce of Queen's University and H. C. Cooke of the Dominion Geological Survey. The chief item on the "menu" at the meeting of the geological section was a discussion of pre-Cambrian nomenclature and classification.

The geological section of the Royal Society, which is one of the oldest societies in Canada, having been founded in 1879, has been considerably enlarged of late years and shows more life. For many years there was little encouragement to geologists to become members of this Society. The geological section now numbers about thirty fellows.



# Another Coal Producer Ready

SHAFT No. 1B, AT GLACE BAY, NOVA SCOTIA,  
SUNK AT RATE OF 81 FEET PER MONTH

By JOHN MOFFATT

Floating in the breeze from the head frame of No. 1-B Colliery on a beautiful May morning, the Union Jack attracted the attention of the populace of Glace Bay. The glorious old flag was unfurled to tell to the mining world that a new shaft had pierced through to the coal, and another great producer was added to the chain of large collieries, dotting the shore line from Port Morden to Little Bras d'Or. Standing within a quarter of a mile of one another there are now three large shafts, which, when all are producing, will give a daily output ranging from seven to eight thousand tons. The flag was intended to do more, however, than make a mere announcement, for the construction department of the Dominion Coal Company had decided to do three things last November, when it was purposed to sink the shaft. These were, to reach the coal on or before the 15th of May, to do it within a certain estimated cost, and to practise the principle of "safety first" so diligently that the whole force would be on the job when finished. This was all accomplished, and the notable achievement was honored by the flag we love the best. There in the early morning stood the hardy shaftsmen, who had so heartily co-operated to bring this great work to successful completion. Through all the months of a most severe winter, these men had labored in one of the most hazardous of occupations, and had attained their objective. That this should have been accomplished without a fatal or a serious accident (the compensation paid out being almost nil.) gave great satisfaction to all who had to do with the work. That the promise of a bonus had stimulated the miners to greater effort, yet had not led to undue haste or to accident, was indeed cause for congratulation. It showed a perfection of organization that was scarcely to be looked for in such work; for shaft-sinking is a problem in itself, and from the day the first sod is turned until the last shot is fired and the muck loaded away there is constant danger. For protection, hoisting was done through a steel cradle, non-twisting ropes being used on the buckets.

The main points to be considered in shaft sinking are: size of shaft and number of compartments required; organization of working force; sinking plant, engines, etc.; drilling; explosives and blasting; ventilation; unwatering of shaft during sinking; disposal of muck; shaft lining or timbering; speed and cost of sinking.

## Timbering

A description of the timbering of this shaft may be interesting. It is to be a two-compartment shaft, rectangular in shape, 13' 4" by 31' 2" outside the timber, and is timbered and lined according to the square-set method with hard pine throughout. This timber was installed in 36-foot sections, each section consisting of 6 sets of frame timber, about 6 feet apart, and the whole section supported on 8' by 10" bearer beams, spanning the shaft and set about 3 feet into the rock on each side. Each set consists of 2 wall plates 8" by 10", 2 end plates 8" x 10" (pieces parallel to the short

axis of the shaft), and 4'6" posts or studdles to keep the plates in the proper horizontal position. These plates are framed with tenons and the posts dapped into place, so that they go together without the use of bolts or nails.

In order to divide the shaft into the necessary compartments for cages and pipe lines, cross timbers called divides or buntions are put in (in the same places as the plates) and extra posts are placed opposite the end of each buntion. These buntions are framed into the wall plates with a V-shaped tenon, so that the weight of the timber keeps them in place. Each set is framed from templates on the surface and marked so that when it is sent down the shaft it matches and goes into place without any extra cutting or trimming.

The rock sunk through was principally grey shale, which when exposed to the atmosphere slakes and spalls off. To prevent any of this from falling into the shaft, the space behind the timber sets is filled with three-inch hard pine plank placed tight, and the space between this lagging and the rock walls packed with broken rock to keep the wall rock from starting.

## Speed of Sinking

The best month's work was in March, when progress of 105 feet was made, and 1,924 cubic yards was excavated. In addition to this sinking, 136 feet of shaft was timbered. The average rate of sinking was 81 feet per month, which, considering the season of the year, the size of the shaft, and the difficulty the men had in getting to work, is well worth noting.

Comparisons of shaft sinking gives little information when the nature of the ground and other difficult conditions met with are not known. For instance in one month a shaft was sunk to a depth of 427½ feet. This was exceptional, but when the size of the shaft is considered, it being only 5'6" by 15 feet, Dominion No. 1-B far out-stripped it when it comes to the displacement of rock, as 85 feet per month would then equal the above record. In addition the shaft was timbered and lagged as described.

The following is a list of some shafts and speeds of sinking:

Tamarack No. 5 Lake Superior District, 29'2" x 8'10" — 5 compartments. Total depth 4,580 ft. Best rate of progress 85.75 ft. per month.

Pocahontas Colliery Shaft W. Va., 14'x22"—3.33 feet per day.

Pennsylvania Anthracite Shaft, 44' x 24"—952 ft. deep, 90 ft. per month.

Rand Shaft, South Africa, Durban 18'x8' — 1,444 ft. deep, 87 ft. per month.

Summer West, 28'x8' — 3,408 ft. deep, 130 ft. per month.

Jupiter, 28'x8' — 3,752 ft. deep, 135 ft. per month.

Gov. Gold Mining Areas, Rand, 45'x10' — Rate 194.3 ft. per month at depth of 1971'.

An average rate of progress for 10 shafts put down in the Rand district worked out to be approximately 140 ft. of advance per month. A similar record for 11



shafts sunk in the United States during the same period gave a progress of approximately 100 ft. per month. The variation is accounted for by the difference in working conditions, and also by the fact that all the South African shafts are in the same locality and hence have their methods standardized.

The drills used were the Waugh 55 Clippers with 78 inch hollow hexagon steel. The explosive used was 40 per cent. Polar Forceite and it took about 1.4 lbs. per cubic yard of rock in place. Blasting was done by electricity from the power circuit, using delay action fuses, the usual practice of shooting first the sump or wedge being followed.

The shaft was ventilated by an electric driven blower fan on the surface and the air conducted to the working face by flexible canvas tubing.

Very little trouble was experienced from water, most of it draining away through a bore hole that connected with the underground workings of the Phalen seam.

and an I beam 12"x5" is set in the floor between stanchions, making a complete rectangle of steel, concrete being filled in between the webbs of adjacent frames.

The shaft is designed to handle 2,500 tons per shift of eight hours, but provision has been made to install double-decked cages at some future date, if it should be found necessary, which will double the capacity of the shaft. Every endeavor has been made to install labor saving devices and to reduce manual labor to a minimum.

A large central pumping station will be placed at the pit bottom, delivering 2,500 gallons per minute against a 680-foot head. Sulger electric turbine pumps being used.

### Mine Equipment

In order to take a considerable part of the large volume of air necessary to ventilate this mine, a dumb drift is driven from the main airway 100 feet to a seam of coal 100 feet from the shaft bottom, which



The crew that sank No. 1 B shaft at Glace Bay

The rock was hoisted in iron buckets, three feet in diameter by three feet high, to the bank head, where it was dumped into storage pockets and from these into railway cars.

### Equipment of Shaft

The pit bottom is 23 feet 6 inches wide. The cage holds two pit tubs side by side, each carrying 2½ tons of coal. The track gauge is three feet. Electric locomotives will bring 50 cars into the mine bottom siding. From there a creeper regulates the delivery of the tubs to the cage and at a distance of 50 feet from the cage the tubs run by gravity onto it.

A special regulating device delivers the tubs to the required track. When the car stops are lowered the empties run off by gravity to a creeper which distributes them to the empty locomotive siding, from which they are taken to the haulage.

The shaft bottom is very strongly supported, by artificial means, due to the only possible location of the shaft being in an area where pillars of none too great size had previously been left. At the wider part of the pit bottom, steel stanchions of Bethlehem section 12"x12" support the roof girders of 12"x18" section

delivers the air into the shaft.

The main shaft bottom level is equipped with electric traction haulage. This main level is of a most substantial character, well supported throughout in the roof with steel. The track is laid with 60 lb. rails. A wide side has been left for travelling, there being three feet between the wall and the side of the pit tub. The electric cables are hung on the opposite side and guarded by two boards hanging down. Workmen will be taken to work in mine cars along this road.

There is about a mile of rise coal and an unlimited area seawards. The coal above the bottom will be taken in by gravity. Trolley haulage locomotives will only be taken in as far as the first working headways, and, to insure safety, storage battery haulage will do the most of the inside work. Of course there will always be the small donkey engines inside operated by compressed air.

Large double airways, most substantially built, are carried right into the workings, the object of the management being to make everything of a permanent nature in view of this shaft being the last from this point of land, the entire workings being submarine



The plant was sunk by the Construction Department, of which Mr. W. H. Graham is Superintendent, D. Colquhoun and William McEwitt, being general foremen, in direct charge. The construction of the pit bottom, the main level, and all underground work was done under the direction of Walter Herd, Mining Engineer for the British Empire Steel Corporation.

### COKE FOR DOMESTIC USE

Most interesting information regarding the making of a by-product coke in Nova Scotia and the possibility of its manufacture in industrial centres for domestic use was disclosed recently when Mr. Frank E. Lucas, for nearly years connected with the coke plant at Sydney, gave evidence before the Senate Fuel Committee. The output there at present is a little over 1,000 tons of coke a day.

A good many of the employees of the Company in Sydney already use coke breeze (pieces less than three-quarters of an inch in size) in their base-burners instead of anthracite coal. Last winter a few thousand tons of coke were sent to Halifax, and there it found a very ready market through local dealers in competition with anthracite coal, with which it compares favorably, ton for ton, in heating value. One dealer reports that he still has plenty of anthracite on hand because he cannot sell it in competition with coke at \$15.00 a ton.

### Industrial Value of By-Product Plant

The value of a by-product coke plant to an industrial community is strikingly put by Mr. Lucas, thus: "The manufacture of one ton of coke made from Nova Scotia coal produces enough gas for cooking for the average family for a year, enough fertilizer for a large garden, enough tar to spray the road in front of your lot, and enough motor fuel to drive your car fifty miles. I regard the installation of by-product plants in, say, Montreal and Toronto as one of the greatest economic assets the country could have. It would be an asset in the industrial development and building up of those areas practically equal to what happened in either because of the introduction of cheap hydro-electric power."

The size of a by-product plant has, of course, much to do with the cost of its products. A 1,500-ton a day plant, said Mr. Lucas, would turn out coke at about 30 or 40 cents a ton less than a 1,000-ton plant. In a 100 ton plant, such as those now used in some cities to supply gas, the cost would be much greater. A town of 60,000 to 80,000 population with a fair amount of industries could, Mr. Lucas judges, take care of the products of an economical plant.

### Cheap Gas For Cooking And Heating

"It has been the history in every case where by-product ovens have gone up in or near a city that there has been a cheapening of the gas because gas may thus be sold to a gas plant cheaper than they can make it, and still leave a fair price for the by-product plant."

The use of this cheap, surplus gas for domestic and industrial heating is the natural provision for its disposal. There is usually a residual tar product after the more volatile and more valuable constituents have been removed from the tar for the scrubbers, and this can be used economically as a binder in making briquettes from fine fuel, as such screenings.

After the hearing before the Senate committee, Mr. Lucas submitted a supplementary written statement, as follows:

### Large Plant Most Economical

"With further reference to the question as to how small an installation would be economical. It is well to remember that in common with most all manufacturing industries quantity production makes for cheapness of the product, and where possible, plants should be located at the largest centres. The coke coming into competition with anthracite can stand freight to the smaller towns and the gas can be carried in small mains under high pressure to any reasonable distance from the coke plant. One plant is delivering gas 120 miles away, so without the high operation costs necessary in small units it would be possible for the smaller towns to have all the advantages of gas fuel or coke equal to the large city where the plant was located.

"Contrary to a more or less popular conception a by-product coke plant is a very flexible installation. The production can be varied down to twenty-five per cent of the maximum without changing the quality of the product. The cost, of course, will be higher due to the same overhead and labour being charged against the small production. The quantity of saleable gas per ton of coal coked can be increased by upwards of forty per cent by heating the ovens by producer gas, and sending out all the gas made in the ovens. Or a still further increase can be arranged to take care of peak or winter loads by making water gas from some of the coke.

"**Loss in Handling.**—Once the coke is prepared at the plant for domestic use there is no loss in handling or breakage which would necessitate screening at the yards of the retailer.

"**Cost of Transportation.**—The railroads generally have set a rate on coke considerably higher than on coal, but this rate has been based on foundry coke which is the largest size and consequent low weight per cubic foot of car capacity. In the case of domestic coke, which is much smaller, there is very little void and cars can be loaded practically to their rated capacity, so that it would be reasonable to expect a lower rate.

"**Marketing.**—In a district like Montreal or Toronto, where domestic fuel has been 100 per cent anthracite, it would doubtless take a little time and entail considerable expense to introduce coke. It is however, from the standpoint of excellence and also from an economic standpoint the logical fuel, coupled with the gas which will be produced in such large quantities. Oil, peat and wood may be a more economical fuel in certain favoured localities, but none of them can be looked to as an effective or permanent cure for the present condition of depending on American anthracite.

"**Cost of Production.**—I have been asked this question and while I do not think it would be advisable to publish a balance sheet of operations which at the best would not be appreciable to all locations, I will state that domestic coke which is in every way and for every purpose superior to anthracite, can be manufactured and placed on the market at a price to compete with anthracite.

"**Government Aid.**—I have also been asked about Government aid for the building of a coke plant. I believe this would be advisable for the first plant at least until such an industry became established, but I do think that such aid should be preferably given to a company who would use Canadian coal.

The Schwab steel interests have lately purchased important zinc holdings in Oklahoma, on the express grounds of protecting their supply of zinc, of which the steel industry consumes 70 per cent of the annual production.



## SILVER PRODUCTION LINKED WITH GOLD AND BASE METAL MINING

In its current monthly review, the Mercantile Trust Company of California presents a study of silver production in the United States that shows clearly how it depends principally upon the amount of other metals produced. The following is extracted from the article:

What effect a reduced price for silver will exert upon business conditions in the western states cannot accurately be foretold. In a consideration of this question, however, it is well to bear in mind that metal mining in the western states as a group can not now influence the ebb and flow of good and bad times to the extent that it did in earlier years.

Although as an industry metal mining has grown greatly, its relative importance has lessened as agriculture, lumbering, petroleum production, and allied industries expanded more rapidly.

For instance, gold mining was once the principal, and for a time almost the sole, industry in California. Nowadays such an unromantic item as the hay crop of California annually exceeds the state's entire yearly output of the precious metals.

Building stone, cement, brick — lowly products dug from the earth for structural purposes — now annually exceed in California the state's entire yearly output of precious metals.

There are, of course, districts and communities in which metal mining is the principal, and almost the only, industry. But even among such districts there are few in which the price of silver alone is the controlling influence.

Silver is mined principally in conjunction with other metals. In many districts it is almost entirely a by-product and the annual output of silver in such districts is governed not by the price of silver but by the price of copper, or the price of lead, to the production of which the production of silver is largely incidental.

The big jump in silver production in Utah in 1922, was in large part a reflection of the improvement in lead. In that year lead sold at an average of 5.7 cents a pound compared with 4.5 cents in 1921, while Utah's output in 1922 was 67,000 tons, an increase of 50 per cent over the preceding year. About half the silver mined in Utah comes from lead ores.

In Idaho between 90 and 95 per cent of all silver produced is mined from lead and lead-zinc ores. The price of lead and zinc, as well as the price of silver, therefore have a direct and important bearing on the amount of silver mined.

A heavy decrease in the output of lead and copper in Montana in 1921 was mainly responsible for the sharp decline in silver production that may be noted in that year on the chart. Over half the silver from Montana is mined from ores in which lead and copper predominate.

Montana's output of silver in 1916 — a year of good copper prices — was over 16,000,000 ounces although the average price for silver was less than 66 cents. Two years later, also a good copper year, Montana's output of silver was about the same as in 1916 although silver meanwhile had risen to an average price of a dollar an ounce. But in 1921 Montana's output of silver was only six million instead of sixteen

million ounces, although a minimum price of \$1.00 an ounce for silver throughout that year was guaranteed by the Pittman act. The prices of copper and lead, and not the price of silver, caused the drastic reduction in silver output.

In the same way higher prices for copper and lead in Montana in 1922, resulting in increased production of those metals, carried silver production up again despite the fact that the price of silver was unchanged.

A somewhat similar story may be told of Arizona. Far more than half the silver produced there comes from copper ores, and 10 or 15 per cent from lead ores. The year 1921 was one which registered a heavy drop in both copper and lead production, with a noticeable decrease in silver as a result, although the price of silver was held at \$1.00 an ounce.

"The total number of silver mines and the total production of true silver ores are both very small," says the United States Geological Survey.

According to the same authority nearly all the ores mined for their precious metal content are primarily gold ores.

Nearly all the silver in Nevada comes from ores mined for their gold and silver content. The total recovery of silver in the whole country from this kind of ore was greatest in 1913, when the output from the Tonopah district of Nevada was at its height. In that year Nevada supplied over 54 per cent of the silver recovered from ores in which the precious metals predominated. Since then the percentage has steadily dropped, until in 1921, the latest year for which figures are available, the proportion was only 27 per cent.

It is interesting to note that in 1919, when silver prices were higher than they had been since 1882, silver production was at its lowest point for many years in three of the places where it comes mainly from precious-metal bearing ores — Nevada, California and Alaska. In all three of these gold production was at a lower ebb than it had been in any previous year since 1905.

Although the current commercial price of silver is now, and for many months has been, considerably lower than the guaranteed Mint price of a dollar an ounce that producers of domestic silver have enjoyed, it does not necessarily follow that the production of silver in the western states will decrease in the same proportion that the price of silver decreases. It is interesting to note that there was a large production of silver in many years when the average price of silver was far less than \$1.00 an ounce.

The average production of the eleven western states and Alaska combined was in the ten years preceding the war approximately 59,000,000 ounces. And in those ten years the average annual price ranged from 68 cents at the highest to as low as 52 cents.

In startling contrast to this are the years 1919, 1920 and 1921 when the price of silver was either far above a dollar or was guaranteed not to go below a dollar. In not one of these three years did the silver output of the group equal the average of the preceding years when prices were low.

Producers, refiners and sellers of silver in the United States control between 85 and 90 per cent of the world's production, according to estimates of the Geological Survey, but the price depends principally upon the demand from foreign countries.



## THE EMPIRE'S RESOURCES IN THE RARER METALS

### A Wide Field Open For Investigation.

Professor G. F. Morgan, head of the Chemical Department of the University of Birmingham, recently delivered an address on "The Empire's Resources of the Less Common Metals," which is reported in the *Chemical Trade Journal and Chemical Engineer*.

Professor Morgan referred to the Empire's resources in the precious metals, gold and silver, and also to the light metals, aluminium, magnesium, and beryllium, which are of special interest in the production of light alloys. Ultra light alloys are now being produced by the Magnesium Co., Ltd., of Wolverhampton. The metals of the less common earths are utilised chiefly in the form of their compounds. Barium and strontium preparations are largely derived from British sources, and the world's requirements for thorium and ceria employed in the incandescent mantle industry are largely supplied from the extensive Travancore deposits which will meet the demand for many years.

### Tungsten, the Platinum Metals, and Cobalt.

The favourable situation of the Empire in regard to the supply of tungsten minerals should place us in a premier position for manufacturing tungsten steel, but nevertheless before the war Germany controlled two-thirds of this production, the importation of German tungsten into this country having an annual value of £300,000. He regarded the production of tungsten steel as one of the great triumphs of modern metallurgy. Zirconium was cited as an instance of a metal which has so far been examined chiefly by German and American chemists, the English contribution to this branch of mineral chemistry being very small. There is a world famine in regard to the valuable metals of the platinum group owing to the partial failure of the Russian supply. These metals have been detected in many parts of the British Empire. Tasmania has furnished osmium and iridium, whereas the Sudbury nickel-copper ores of Ontario have yielded notable quantities of platinum and palladium. Cobalt is a metal with a future, coming into use now as an alloy metal instead of being restricted, as it was until recently, to use in combination as a pigment colouring material. Cobalt which is produced annually to the order of about 400 tons confers hardness and durability on aluminium.

The possession of this varied assortment of mineral wealth, said Professor Morgan, carried with it the obligation to utilise this heritage to the best advantage of humanity. If the present possessors fail in this respect, sooner or later the task will be undertaken by others.

### The Magnesium Position

Referring to magnesium, he pointed out that the metal is permanent under ordinary atmospheric conditions, especially when free from impurities. Minute quantities of such foreign substances as alkalis or chlorides cause local granular corrosion. The metallurgy of magnesium depends on electrolytic processes, and considerable progress in its isolation has been made in the United States. The sudden drop in the number gives a solution containing sodium beryllium fluoride of producers and in the output is due to the competition of the German product. Germany controls a large portion of Australian magnesite, and owing to the depreciated currency it can sell in any market in spite of the import duties.

## Research on Beryllium Production

On the subject of beryllium, Professor Morgan had something interesting to say. Owing largely to the headway has been made in the isolation of beryllium, although the physical constants of this metal show that it would be a valuable aid in the production of light alloys. The commonest mineral, beryl, is an acidic silicate of beryllium and aluminium, occurring both in the old world and the new. A well-known deposit exists at Limoges in France, and considerable quantities have been noted in New Hampshire, where beryl crystals of enormous sizes up to 2½ tons occur native. Within the British Empire there is a small unexploited deposit in Glen Cullen, Co. Dublin. It is also found in the former German Colony of S. W. Africa. Hitherto only small quantities of beryllium metal have been produced. The first difficulty encountered in the metallurgy of beryllium is the separation of beryllium from alumina.

Beryl is not appreciably attacked by the common mineral acids. It is opened up, however, by fusion with caustic alkali, subsequent treatment with dilute sulphuric acid precipitating silica. The filtrate contains beryllium and aluminium sulphate, and if the alkali used in the fusion contained potash, a good deal of aluminium sulphate crystallizes in the form of potash alum and is thus separated. The beryllium remaining in solution is partially separated from the remaining aluminium by taking advantage of its solubility in ammonium carbonate, this reagent precipitating aluminium hydroxide. By diluting and boiling the solution, hydrated beryllia is precipitated and converted into the basic acetate, a compound of considerable stability which although only sparingly soluble in water, has the remarkable property of dissolving in such organic solvents as acetone, chloroform, benzene, etc. This beryllium derivative has a definite melting point and when pure can be sublimed without decomposition. These singular characteristics render it useful in the final separation of beryllia from alumina.

Two other processes have been tried with good results at Birmingham University by Mr. Hedley. In one process beryl is heated with hydrogen fluoride and ammonium fluoride until the silicon is volatilised and the residue contains the fluorides of beryllium, aluminium, and iron. The second procedure consists in heating the finely powdered mineral with sodium silico-fluoride. The product on lixiviation with water gives a solution containing sodium beryllium fluoride only, the other constituents remaining as sparingly soluble products. Whatever process is employed we find that the final purification is best effected through the basic acetate.

We are still only on the threshold of the metallurgy of beryllium. The purified acetate must be converted into oxide and fluoride, when, by an electrolytic process akin to that employed for aluminium, the metallic beryllium is isolated. Even a moderate supply of beryllium or its alloys with copper and other metals would be an aid in aeroplane and airship construction.

Aluminium is the only fairly plentiful metal of the light metal group; some of the others, such as scandium, gallium, indium, and thallium being excessively rare. Yttrium and lanthanum belong to the rare earths comprising some 18 elements of which certainly two have met with industrial application. These are



thorium and cerium, both of which are derived from the mineral monazite.

### The Future of Titanium and Zirconium Compounds

Titanium in the form of its oxide (rutile) or as the ferrous compound, ilmenite, is widely diffused and is among the more plentiful elements of the earth's crust. There is as yet no commercial method for producing elemental titanium. Difficulties arise owing to the chemical activity of the element and its high melting point (about 1,800° C.). The most important use of titanium lies in the production of ferrotitanium alloys. These alloys are used as deoxidisers, oxygen and nitrogen scavengers and not as alloying materials. Before the war there were 15 manufacturers of titanium alloys in Germany, 3 in Great Britain, 2 in France, and several in Sweden and Switzerland. Titanium,  $TiO_2$ , is used in pigments and in glass.

Zirconium and its compounds are a worthy subject of chemical research. Mr. Bowen, who has undertaken an experimental study of zirconium and its compounds, has preceded his investigation by a thorough and complete search through scientific literature. He was mortified to find that nearly all the research work on zirconium has been carried out by American or German investigators. The value of zirconia as a refractory material has been clearly demonstrated. It has been employed in making crucibles, muffles and combustion tubes which are gas tight up to 1,000° C. Zirconia crucibles have been used to melt pure iron, platinum, and tungsten alloys. Zirconia linings for the hearths of steel furnaces are very durable. It is also used to produce opacity in glasses and glazes. In medicine it has been substituted for bismuth nitrate as a means of taking X-ray observations of the alimentary tract.

### USES OF PULVERIZED LIMESTONE

In the progress of a study of methods of utilization of waste rock at lime-plant quarries, being conducted by the United States Bureau of Mines, it has been found that limestone pulverized to a much finer grained form than for agricultural use is finding wide application in various products. Small quantities may be added to stock food as a bone builder. A dust approximately 80 percent of which will pass a 200-mesh screen is the most widely used filler in road asphalt surface mixtures, though slate flour and Portland cement and hydrated lime are used to some extent. Ground limestone is used to a limited extent as a fertilizer filler. It has the advantage over inert fillers in that it has valuable properties as a soil conditioner. Very finely pulverized limestone may be used successfully as a whiting substitute in certain classes of rubber, paint and other products. It is essential for such uses that it be very finely ground and uniformly sized so as to exclude all comparatively large-sized grains. In general limestone flour that will successfully meet the requirements of fillers of a type like whiting or china clay should approximate 300-mesh size. Few lime-plant quarries have the equipment for grinding or sizing to this degree of fineness, and have, therefore, been able to utilize this promising field of application.

### ORES OF ALUMINIUM

Minerals containing aluminium are abundant, the most widely distributed being the clays. There are only two, however, thus far of consequence, commercially, in the production of the metal: bauxite (to which may be added the related, hydrated oxides, hydrargillite and diaspore), and cryolite. Cryolite is found in commercial quantities only in South Greenland, and was formerly the only ore of aluminium used, being still employed as a flux in the extraction of the metal. Bauxite has been, for some years, the most important source of aluminium and its salts. Its color varies from gray to brown, its composition ranging usually between the following limits:  $Al_2O_3$ , 30%-60%;  $Fe_2O_3$ , 3%-25%;  $SiO_2$ , 0.5%-20%;  $TiO_2$ , 0.0%-10%. Besides its reduction to the metal, bauxite is also utilized in the manufacture of aluminium salts, refractory bricks, alundum (fused alumina) for use as an abrasive; and in the refining of oil (stated to be of growing importance). The most important producing countries, both of bauxite and the metal, are the United States and France, the former yielding more than 60 per cent of the world's output.

### NICKEL IN AUSTRALIA

The copper ores of Australia characteristically contain a small amount of nickel, from 0.10 per cent upwards. A writer in "Chemical Engineering and Mining Review" proposes to recover part of this nickel by a simple method. As the presence of more than 0.25 per cent nickel in fine refined copper is penalised, and as blister copper for electrolytic refining must not contain more than 0.50 per cent nickel, the amount is reduced to these limits by running slags that contain, in addition to several per cent nickel, a much larger proportion of copper. It is proposed to run this slag, when it has accumulated sufficiently, in the blast-furnace with ore to give a blister copper carrying 10 to 12 per cent nickel. This should be melted in a reverberatory, where the copper will melt while the nickel will oxidise and float as a pasty mass, which can be skimmed off as a dross that will contain a comparatively small amount of copper. Pure nickel can be made from this by electrolysis, using a special container for the dross, which cannot be cast into plates.

### POSITION OPEN IN OTTAWA

Applications will be received, on forms available at the usual places, by the Civil Service Commission up to June 21st for the following position in the Mines Branch: 5435 — An engineer in the Division of Fuels and Fuel Testing, at an initial salary of \$2,100 per annum, subject to annual increase and whatever bonus may be provided by law. The duties will be to assist in both field work and laboratory investigations on Canadian fuels.

Pure antimony metal and manufactured antimony compounds are of considerable importance as pigments in the ceramic industry. The most important use of the metal, commercially, is in various alloys, particularly type-metal (with tin and lead), babbitt (with tin and copper), and Britannia metal (with tin and copper).



## THE USES OF ZINC

Zinc is one of the most largely used metals says the *Bulletin* of the American Zinc Institute. Before the war more zinc was produced than any other metal, except iron and lead. In fact the uses of the three metals, zinc, copper, and lead are about equal in quantity. The reason why so few people realize how much zinc is used is simple: Zinc seldom comes to the consumer alone, or under its own name.

The largest use of zinc is in making galvanised iron, which is iron coated with zinc by dipping it in a bath of melted zinc. This gives a coating which protects it from the action of the weather, and if properly done, increases its life manifold. Many people know that "galvanising" is coating with zinc, but as the product is known as iron they do not realize that it owes its value to the zinc coating.

The next largest use of zinc is in making brass, which is an alloy of zinc and copper, containing from 5 per cent to 50 per cent. of zinc (usually 25 per cent. to 33 per cent.), frequently with the addition of small quantities of other metals. The properties of the alloy depend on the proportions of the different ingredients. By properly varying the constituent alloys, a great variety of strength, hardness, and ductility can be obtained, and these make the brass suitable for an infinite number of purposes.

Sheet zinc is used to a fairly large extent, but not nearly as largely as its good qualities deserve. On the continent of Europe zinc sheets are the most common metallic roofing.

All of the common metals are attacked by air and moisture, but the results of this attack vary greatly. Zinc, however, when exposed to the weather, becomes covered by a thin, hard and closely adherent crust of basic carbonate of zinc, which completely protects the metal beneath. The coating, being hard and adherent, does not stain other objects. In practically all cases where galvanised iron is used sheet zinc would be better. Its first cost would be higher, but its much longer life would more than compensate for this.

Zinc roofs have been in use in Europe for about 100 years, and some of the original roofs are still in place, and in good condition. A few zinc roofs were put on by the Lehigh Zinc Co. when it operated a rolling mill in Bethlehem some time between 1860 and 1870. These roofs were in perfect condition when the buildings were torn down, after 50 years, and had never required repairs and were never painted.

For flashing, gutters, and leaders, zinc is an ideal material, if a suitable grade of zinc is used, and is properly installed. There are several grades of zinc on the market, containing varying amounts of impurities. For most of the purposes for which zinc is used these impurities are not injurious in the quantities in which they occur in commercial zinc, but they all make the zinc harder and more brittle, especially at low temperatures. As the sheets used for flashing, gutters, and leaders must be bent sharply and often in cold weather, only the purest zinc should be used for these purposes.

Zinc castings are used to an extent that very few realize, as they are nearly always plated with some other metal, and usually are sold to the consumer as bronze. All sorts of ornamental objects, electric fittings, lamps, jardinières, ash receivers, ink stands, etc., are made in this way. Zinc is very suitable for such purposes, as it makes sharp and accurate castings, which can be plated with any metal.

Zinc is also used in separating silver from bullion. In a great many cases silver and lead occur in the same ores, and when these ores are smelted the resulting metal or bullion contains both the lead and silver—a ton of bullion containing only about 100 to 200 oz. of silver. The easiest

way to separate them is to add some zinc to the melted bullion at a temperature high enough to melt the zinc. The mixture is then cooled slightly, when the zinc and silver freeze together, and can be skimmed out. The result is that the silver is recovered in combination with a very small amount of zinc, from which it can be easily separated by distillation.

Still another form in which zinc is produced is a fine powder, called zinc dust, largely used in dyeing and in the manufacture of dyes, in recovering the gold extracted from ores by the cyanide process, in flashlight powders, and in other products. During the war a great deal was used in shells to give a cloud of white smoke to mark where the shell struck.

In addition to its use as metal, a great deal of zinc is used in making salts and pigments. The most largely used salt of zinc is the chloride, which is used in preserving timber from rotting and in making fibre ware.

The two zinc pigments are the oxides, either commercially pure oxide of zinc, or mixtures of zinc oxide and basic sulphate of lead (known as "leaded oxide"), and lithopone, a mixture of sulphide of zinc and sulphate of barium.

Zinc oxide is one of the most largely used pigments, and is used in all of the better enamel paints, flat wall finishes, and most of the mixed paints. It is of pure and brilliant white, and does not darken or change colour on exposure, nor does it chalk and rub off. Experience has shown that a mixture of pigments gives a better paint than any single pigment. Zinc oxide, on account of its good and uniform colour and permanence, is the most valuable single ingredient of these mixed paints. It is also used in the manufacture of enamelled cloth, oilcloths, and linoleums.

The leaded oxide is not of quite so good a colour as the pure zinc oxide, but is an excellent pigment, and is largely used in tinted paints.

A very pure variety, known as pharmaceutical oxide, is made by special processes from selected materials, and is used in medicine, for face powders, and other purposes, where extreme purity is necessary. During the war large quantities of it were used under the name of "sag paste," as a protection from and cure for mustard gas burns.

Zinc oxide is very largely used in the manufacture of rubber goods. Pure rubber alone is useless for such mechanical purposes, as automobile tyres. A tyre of pure rubber would wear out in less than 100 miles, but when reinforced by a pigment such as zinc oxide, this can be increased to 8,000 or 10,000 miles. An automobile tyre may contain as much as 25 per cent. of its weight in zinc oxide.

Zinc oxide has been used successfully as a rubber filler ever since the development of rubber compounding. This is due principally to the fact that the zinc oxide particles adhere firmly to the rubber and increase the strength and wearing properties of the compound article. Then, again, the life of the rubber is prolonged rather than shortened by the use of this pigment.

Lithopone is a comparatively new pigment, and its use is increasing very rapidly. It is made by mixing solutions of zinc sulphate and barium sulphide in the proper proportions. The resulting product is a combination of zinc sulphide and barium sulphate, very closely bound, and of much better hiding power and colour than can be made by mixing the same two salts separately made. Lithopone is a very brilliant white, and is permanent in colour, if properly made. It is very largely used in making the popular flat wall finishes and other interior paints. For outside paints lithopone alone is not satisfactory, but a mixture of it with other pigments gives good results. It is also used



in making enamelcloth, oilcloth and linoleums. For certain grades of rubber goods it is largely used, as it gives an excellent colour, with good strength, and other desirable qualities.

### THE HEALING POWER OF BUSINESS

In 1921 more than 3,000,000 tons of coal were shipped from the United States to England, and coals were literally carried to Newcastle and unloaded there. The following year slightly over 3,000,000 tons of coal were shipped from the United Kingdom (some of it from Newcastle) to the United States. Now, in the spring of 1923, the last of the incoming shipments of coal from the United Kingdom again meets the first of the outgoing cargoes of coal from the United States to continental Europe, and the economist, perhaps, throws up his hands in despair at the unwarranted waste of carrying these millions of tons back and forth across the sea.

But instead of assuming such an attitude he should give thanks for the saving grace of the trader's flair for business, which brings the things that humanity wants to the place where it wants them in spite of "strikes, war, pestilence, acts of God, or force majeure."

All this is nothing new, but the thing that is new is the fact that the healing currents of business now flow far more swiftly than in the past to fill a want created anywhere in the world. Inflation and deflation, prosperity and hard times tread more quickly on each other's heels that was their wont in days gone by. This is because the means of communication grow ever better and draw the world closer together.

Thus it behooves the international trader of to-day to keep his eye on the far horizon, for the far horizon is, after all, not so very far away. —Commerce Reports.

### A BIBLIOGRAPHY OF COLLOID CHEMISTRY

The National Research Council, Washington, has recently issued a colloid bibliography in mimeographed form. The author, Dr. Harry N. Holmes of Oberlin College, Chairman of the National Research Council Committee on the Chemistry of Colloids, intends this edition to be preliminary to a more comprehensive one. Yet it is a book of 135 pages containing 1,800 references on 106 topics. All the references are classified and many are accompanied by brief reference as an aid in deciding on their relative importance. This book may be purchased from the Washington office for \$1.00.

Among the classified groups are Absorption, Asphalt, Baking, Bicolloids, Capillary Analysis, Casein, Cellulose, Cellulose Esters, Cements, Clays and Soils, Cleansing, Coagulation, Dialysis, Emulsions, Filtration, Flotation, Foam, Flour, Fogs, Gels, Gelatins, Glass, Glues, Gold, Gums, Hydration, Indicators, Jellies, Lubricants, Milk, Paints, Peptization, Petroleum, Photography, Protein Swelling, Protection, Rubber, Sewage, Silver, Soap, Sulfides, Surface Tension, Tanning, Ultramicroscope, Viscosity, and Waterproofing.

The theoretical and industrial importance of colloid chemistry is now admitted without question; in fact it links together the sciences of chemistry, physics, zoology, botany, geology, medicine, agriculture and even astronomy, when that science deals with comets' tails. Few are the industries that do not have colloid problems to solve. The average citizen is surprised to learn that his own body is colloidal in composition, that his digestive processes are governed by colloidal rules of action and that the bacteria of disease are of a colloidal degree of

dispersion. And he is astonished to learn that but for the colloidal absorption of calcium phosphate from the blood stream by his bony cartilage he would be a mere spineless jellyfish. As colloid chemistry is surface chemistry, it is of importance to this same average citizen to know that the total surface of his blood corpuscles is about one acre.

### THE COLOR FACTOR IN TALC

A very pure white is demanded by many consumers of talc, but no standard, accurate method of detecting slight differences in color has been devised, states R. B. Ladoo, mineral technologist of the United States Bureau of Mines, who has completed a study of the mining, milling and uses of talc. Practically all talc producers make a rough comparative test by the unaided eye, usually comparing tales to a sample taken as a standard, which varies for each producer and consumer. The talc is either placed in little heaps or is spread out flat with the finger or a knife, on the hand, or on blue or white paper. Probably the best the best method now in use consists of forming two small piles of the material used as a standard and of the talc to be tested, pushing the heaps close together and flattening them with a spatula so that the contact between the heaps is a smooth straight line. If the tales are then wet with a few drops of turpentine, slight differences in color may be detected; but even this method is not satisfactory, as no standard samples are used in common by the whole industry, and differences in light and in human perception give different results. Often the accurate determination of slight color differences is of utmost importance, for color is not only an index of value but frequently is an indicator of proper methods of grinding. Poor color is not always due to impurities, but may be due to insufficient or improper grinding. Thus a yellow hue in a tale was attributed to iron, but microscopic examination proved that finer grinding would eliminate most of the objectionable tint. Finer grinding of many tales improves the color. A uniform and standard method for the determination of color should be devised and adopted.

### LIGNITE CHAR

At the spring meeting of the American Institute of Mechanical Engineers, to be held in Montreal, O. P. Hood, Chief Mechanical Engineer of the United States Bureau of Mines, will present a paper on "Lignite Char,." This fuel is made in single ovens where moisture is first driven off and then volatile material distilled, leaving the fixed carbon, much shrunk from its former size, as a fairly porous material with much the same analysis as anthracite coal. It ignites readily and burns freely. It can be briquetted to give a domestic fuel unsurpassed in qualities; but the char itself is a satisfactorily domestic fuel if handled properly. The distilled gases are used as fuel in the kiln, which is somewhat similar to an open-top lime kiln. One ton of char is produced from about 2½ tons of raw lignite.

The new mill of the New State Areas, South Africa, designed to handle 50,000 tons a month, is nearing completion. It is the first mine on the Rand to discard stamps in favour of rolls.



# THE MINING DISTRICTS

BY THE JOURNAL'S CORRESPONDENTS.

## NORTHERN ONTARIO

**Porcupine.**—Production at the Dome is stated to be at the rate of over \$400,000 a month, the daily tonnage going to the mill being approximately 1,250 tons. The annual meeting of the shareholders is to be held shortly, and it is understood that some of them will insist on a definite policy as regards dividends. While the President has stated that in July the dividend will be doubled, it is not certain that all the directors are in favour of this policy. Proxies are being asked for in the names of Ernest C. Whitbeck and Jacob E. Rosenberg, both of Rochester, who are said to be large shareholders. While the proxies are not being solicited with the view of ousting the present directorate, it is desired to have these two gentlemen on the board so that better representation may be given to certain large shareholders. The recent raid on the stock, which resulted in a severe drop in prices, will, no doubt, give a certain impetus to this movement.

The Hollinger has declared the regular four-weekly dividend of 1%, payable on June 18th, to holders of record May 31st. The company is continuing to increase its production. Practically all the available power in Porcupine is being used by the three big companies.

The Porcupine mines now have the largest number of workers in their history and these are being added to daily. The strike talk appears to have pretty well died down and it is reported that of approximately 4,000 men employed at the mines only 532 cast ballots at the recent strike vote. Of this number about 400 voted for a walk-out, or only about 10% of the employees. The Union officials have announced that they will extend the privilege of voting to the non-union members, but as less than half the union members voted, it is not anticipated that the non-union members will make as good a showing.

At the Night Hawk Peninsular approximately ninety men are employed and work on the construction of the mill is well under way. Underground development continues to be promising, and the property looks like a profitable producer.

An interim report issued by the Porcupine-Davidson Gold Mines, Limited, states that a large amount of diamond drilling has been done which indicates the existence of 700,000 tons of ore, averaging \$9.25 a ton. This ore is reported to exist between the 500 and 1,000-foot levels, while above the 500-foot level the estimated ore reserves are approximately 330,000 tons of \$11.00 ore.

This makes a total of over \$10,000,000 estimated ore, most of which is based on diamond-drill results. It is well to point out, however, that none of the producing mines of Porcupine ever estimate ore with no further information than that obtained by diamond drills. The company is commencing the sinking of a three-compartment shaft, which will be continued to the 1000-foot level. A temporary head-frame is being erected and a steel head-frame is on order. Plans for the 500-ton mill have been prepared and it is expected that construction

will be commenced in the near future. The company has cash assets of approximately \$550,000.

At the Clifton Mines a diamond-drilling campaign will be undertaken on the 200-foot level in order to gain further information before sinking a new shaft.

**Kirkland.**—It is reported from Kirkland lake that two veins, carrying substantial values, have been intercepted on the 450-foot level of the Montreal-Ontario.

**Larder.**—Reserve will shortly offer 500,000 shares of stock at sixty cents a share, subscriptions to close June 15th. The proceeds of the new issue will be used to continue development work and to prepare the foundations for a mill. It is expected that when construction work on the mill is commenced a further issue of stock will be made.

**South Lorrain.**—There is much activity in the South Lorrain district, and several new deals have recently been reported. A deal has been negotiated for the sale of the bed of Trout Lake, which lies South of the Keeley. A shaft has been sunk on the shores of the lake to a depth of 275 feet, and it is probable that this will be continued. J. H. Rattray is in charge of a group of claims, on which work is being commenced. The Lorrain Consolidated has shipped a mining plant to the property and as soon as this arrives underground work will start.

The Mining Corporation continues to obtain a substantial production and in April shipped 183,000 ounces. Shipments in May were small on account of the bad roads, which made it almost impossible to get the ore out. So far the company has produced over 1,000,000 ounces from one shoot on the Woods vein alone, and during the first four months of the present year the company's production from the South Lorrain property has been approximately 750,000 ounces.

**Cobalt.**—The report of the Peterson Lake for the year ending April 30th shows an operating loss of \$24,472. The profit and loss balance has been reduced to \$77,286. The balance sheet shows liabilities of \$96,000 and current assets are figured at \$70,000, which includes ore reserves of \$49,000. During the early part of the year the Dominion Reduction Company mill treated old tailings on a joint account with the Peterson Lake. However, the silver content proved to be low, and the expense of overhauling the mill was heavy, so that operations resulted in a loss to Peterson Lake, and the property is now under option to the Mining Corporation.

**Rouyn.**—La Rose Mines has taken an option on three claims in Rouyn township and has sent in a gang of men to prospect them. The Lyman-Quebec syndicate has also sent in a crew to start exploration work. The diamond-drill that has been operating on the Hammill option has been moved over to the Noranda Mine claims, where it will probably be kept for the rest of the summer. So far, work on the Noranda has been confined to surface exploration. Transport companies have been formed to operate trucks and motor boats into the district, so that travelling is now comparatively easy.



## NOVA SCOTIA

**Wabana Activities**—The Wabana iron ore trade, while not as promising as last year, is nevertheless fairly active. Whether this activity will continue throughout the year, will soon be known. Last year the German trade took 750,000 tons of ore, and it was found so satisfactory and so suitable for steel production that an offer was made the Empire Steel Corporation for the trade of this year. The occupation of the Ruhr district by France dislocated trade and affected Wabana production seriously. In the middle of January of this year the Wabana mines were closed down and the outlook seemed black; but the Premier of Newfoundland, sizing up the situation saw that something had to be done to help the workmen of his country. He therefore visited President Wolvin of the British Empire Steel Corporation and an arrangement was entered into by which the mines were to be re-opened and kept running during the months of March, April and May, giving employment to 1,600 men. The company on their part were to have the ore export tax remitted during 1923. Since this agreement was drawn up, conditions in Germany have not improved radically, and possibly the shipment to that country will not exceed 150,000 tons. However, other orders have been received from the United States and from British firms, and although smaller, not exceeding 125,000 tons in all, they form a nucleus for future business that may develop during the present year. Conditions are not stable and the maximum output capacity is not taken care of by present contracts, and whether the force and output may have to be reduced will be known some time during this month.

At present four mines are in operation, the daily output being 3,700 tons. Approximately 800,000 tons of ore are in the stock piles, and if no new business is forthcoming, some of the mines may have to be closed down and ore shipped from the piles. The Sydney Smelting plant will take about 400,000 tons during the year. Three boats are already in the business, one with a capacity of 10,000 tons and two with capacities of 8,000 tons.

**Newfoundland Labour Conditions**—Newfoundland in the past furnished much labor to the Cape Breton collieries. But during the last two years, labor conditions have been very much depressed and it has been estimated that fully 25,000 people have left Newfoundland for the United States and Canada to establish homes for themselves in these countries.

The fisheries have been, relatively, a failure, no profit having been made by the fishermen. Indeed, it is a common statement among the fishermen that the more work they do, the deeper they become involved in debt.

At present, the Humber power plans are being completed, and work is going ahead on the large plant, on which men will find employment during the summer.

The Anglo Newfoundland Company has taken over the sulphite pulp plant at Alexandria Bay and have a problem of railroad construction and plant extensions that will give employment to 1,000 men during the rest of the season.

The plant at Grand Falls, with auxiliaries, will employ 1,500 men.

The British Empire Steel activities in Newfoundland will employ not less than 2,200 men, including the force at the limestone quarries at Port Au Port. This makes

a total of 6,300 workmen, which is about the limit of industrial labor in Newfoundland, so that the Cape Breton industries can expect little labor from this source during the present year.

The quarries at Port Au Port will give employment to 350 men for the summer months. About 300,000 tons of limestone will be shipped to Sydney.

**Gull Pond Copper**—The recent diamond-drilling carried out at Gull Pond, Newfoundland, has proved the presence of a very large deposit of copper ore. At present a body of ore 2,200 feet long, 77 feet wide and 1,200 feet deep, carrying high values in copper has been proved. The owners are making arrangements to finance further development, and it is understood they have been successful in raising the required funds. This new copper district will be accessible to the Humber power development and progress should be rapid after the construction of the Humber plant.

A second copper deposit, on the west coast of Newfoundland between Bonne Bay and Bay of Islands, also gives promise of developing into a large producer. Very little work has been done on this property, but the ore is very rich and seems to rival in quality that of the Little Bay deposit.

**J. L. Lewis Sends Commission**—A commission of four U. M. W. officers has been sent by the International headquarters to investigate and report on labor conditions at the Collieries of Nova Scotia. While nothing much is being said at present by the members of this commission, there is enough known of the differences existing between the District and International headquarters, to give a fair idea of the scope of investigation.

The open hostility of the executive of District 26 to President Lewis and their favor of Alexander Howatt has not been concealed. International headquarters has been placed in a most unfavorable light before the workmen on more than one occasion. They have been blamed for withholding funds to enable the district to conduct a campaign against the coal companies. At the investigation before the International Board, President Lewis, in reply to President Livingstone, stated that \$10,000 had been sent into Nova Scotia, when it was needed last year. The executive, however, believe that funds collected for Union purposes should not be used to help along a political campaign of the Workers' Party or to run a newspaper like the *Labor Herald*, which represents this party and nothing else. If the money used had been applied to its proper purpose, there would be no need of financial aid from the United States.

Further, the district was advised by President Lewis last August, when the strike was on, to leave the maintenance men at work. These orders were disregarded and the men were withdrawn from the pumps, boilers and power-houses. The lower lifts of some of the collieries were flooded and much damage was done at that time. But the greatest harm came from the fact that the district was rebellious and failed to comply with the instructions of headquarters.

The election of officers in the district has become a species of political campaign, and the time set by the constitution to hold such elections is disregarded. If some dispute of wages is on, the executive of the district, believing they can win if the dispute is made an issue



bring on the election. In this way the main issue is lost sight of and the organization is used to suit the vaulting ambition of its officers.

The Truro convention, with its resolution to join the Red Internationale, came as the climax of a policy long in the mind of Secretary McLachlan.

While the resolution was passed by the convention, many of the delegates did not take it seriously; but it sufficed to re-elect the officers and to prepare the way for the demonstration held on the first of May in Glace Bay, under the Red banner. The attempt, however, to join up with the Red Internationale estranged the Cumberland and Pictou locals, and they have not ceased since that time to protest against the insane action of their leaders.

The latest development is the forming of the Progressive Workers' Party. Under this name, the locals were lately circularized with the purpose of sounding them on their attitude towards the International Union. If it developed that the Workers' Party showed strength, the International was to be given short shrift. The locals, however, were not blind as to what was taking place, and many of them voted against the Progressive Workers' Party. Nor are they in favor of the four-day week. They are now in the mood to settle down and to be finished with all agitation, which robs their homes of contentment. It is in this state of mind the Commission will find them and the survey of the field by these four Americans should do much good. It cannot possibly do harm.

### BRITISH COLUMBIA

**New Tunnel for Premier.**—A new tunnel, which is expected to be driven a distance of 2,400 feet and which will measure 8 x 9 feet, has been started from near the international boundary line on the property of the Premier Mining Co. Its purpose, it is said, is to give an additional 500 feet depth on the veins being worked and to develop an extension southwest from the present workings that was located by diamond drill. It is reported, unofficially, that a second mill will be constructed near the portal of this tunnel. The Premier camp is being provided with a new bunkhouse containing 100 rooms, and an apartment house and assembly room also are proposed.

**Stewart.**—The Stewart Consolidated Gold Mines Ltd. has been formed to take over some sixty mineral claims in the Bear River section of the Portland Canal District. Capitalization has been placed at \$3,000,000 and it is said that about \$100,000 will be spent on development this year.

F. N. Cronholm E. M., of the Cronholm-Bartholf Mines Ltd., owners of the Bromide Group, Chickkamin Glacier, Salmon River, and E. G. Riebe, consulting engineer of the Silver Bell Mining Co., are recent arrivals at Stewart. They state that their respective properties are to be energetically developed this season.

**Atlin.**—The Engineer Mine, Atlin, one of the most promising of the province's lode gold properties, again is the subject of litigation. Robert E. Williams, Milwaukee, and Horace K. Williams, Los Angeles, nephews of the late Mrs. James Alexander, who, with her husband, was drowned when the steamer "Princess Sophia" was lost with all hands in October, 1918, are suing J. A. Fraser, administrator of the late Captain Alexander's estate. They claim that as next of kin to Mrs. Alexander they are entitled to shares in the estate that includes the Engineer Mine. As there are a number of complex questions to go before the court, such as who

died first, the Captain or Mrs. Alexander, did Mrs. Alexander by marriage acquire a dower interest in the property, and what is the effect of Captain Alexander's will made before his marriage bequeathing all his property to the late A. I. Smith of Philadelphia who financed his operations, it is likely that the legal argument will be extended.

**Rossland.**—First indications of the promised new activity at Rossland are apparent in the action of the Consolidated Mining & Smelting Co. in starting work on a crushing plant at its mines in that camp. The foundation is being excavated on what is known as Centre Star Hill. The purpose of the crusher is to permit the treatment of the ore at the mines before shipping in order to economize on handling at the smelter.

**Canada Copper Co.**—The announcement from New York that the Granby Consolidated Mining & Smelting Co. has taken over the Allenby Copper Co. (known locally as the Canada Copper Co.), and that the mine and mill at Allenby will forthwith be opened up, has been received in British Columbia as one of the most important western Canadian mining developments in years. It has long been known that this was the intention, but the news that all formalities have been successfully completed, and that operations in a large way are without question about to start, has been generally welcomed.

**Geologists Ready For Field Work.**—Dr. W. E. Cockfield and Dr. C. C. Cairnes, of the Geological Survey of Canada, have arrived in Vancouver. For eight seasons Dr. Cockfield has conducted geological survey parties to the Canadian Yukon Territory and now is on his ninth trip. He will work in the southern Yukon but intends, incidentally, to visit the Mayo District for the purpose of noting the development of the past two years. One-third of the Yukon, Dr. Cockfield says, has been explored and found rich in minerals, and the geological exploration of the remaining two-thirds is expected to be interesting in its results. Dr. Cairnes is to continue his work of last year in the district between Hope and Princeton in the Nicola-Princeton District of British Columbia.

Harlan I. Smith, archaeologist for the Canadian Geological Survey, also is in the Province prepared to carry on his field work. He will spend some time this summer among the Indians adjacent to Bella Coola, on the west coast of the provincial mainland.

Dr. G. S. Hume, of the Geological Survey of Canada, has passed through Edmonton, Alberta. He proposes surveying the region between Fort Wrigley and Fort Norman on the west side of the Mackenzie River. It is his intention first, however, to examine clays of reported economic value occurring between the Muskeg and Moose rivers and on the Calumet river. W. A. Kelly and J. O. G. Sanderson, Alberta University men, will conduct surveys on the Dahadinni, Red Stone and Little Bear Rivers.

Dr. M. Y. Williams will be engaged in geological survey work in southern Alberta this season.

**Chief Inspector Resigns.**—James McGregor, who has been Chief Inspector of Mines for British Columbia since the 10th of May 1920, has resigned the position because of ill health. The duties of the office will be taken over on the 1st June next by George Wilkinson, who was Chief Inspector from the year 1917 to 1920 and resigned to become General Superintendent of the Pacific Coast Coal Mines Ltd.

In making this announcement Hon. Wm. Sloan, Minister of Mines, stated that it was a matter of sincere



regret, not only to himself but to all officials of the Department of Mines, that Mr. McGregor should be compelled to relinquish office on account of poor health. He had been in the service of the department for about twenty-five years and had a record throughout that period of efficiency and conscientious attention to duty. From the age of fourteen years up to the date of his entry to the Civil Service he had been prominently connected with the coal mining industry of Vancouver Island. It was Mr. Sloan's hope, and that of all Mr. McGregor's associates, that he would be restored to complete health.

Mr. Wilkinson, who takes over the office, has had many years experience as a mine operator and engineer in this Province. Prior to becoming Chief Inspector in 1917 he was manager of the Western Fuel Company's Reserve Mine at Nanaimo. Born in Cumberland, England, May 27, 1875, he was at work in the mines there for five years before coming to Vancouver Island in 1896, since which time he has been engaged, practically without cessation, in and around the coal and metaliferous mines. His technical qualifications are the highest, as he holds a first-class manager's certificate for both British Columbia and Alberta and is a member of the B. C. Institute of Engineers.

**Trail Ore Receipts.**—Ore receipts at the Trail smelter, Consolidated Mining & Smelting Co. of Canada, for the week ending May 14th totalled 9,918 tons. The detailed shipments follow:

| Mine                     | Tonnage |
|--------------------------|---------|
| Alamo, Alamo             | 93      |
| Bell, Beaverdell         | 47      |
| Black Rock, Northport    | 40      |
| Company Mines            | 9,009   |
| Galena Farm, Silvertown  | 52      |
| Knob Hill, Republic, Wn. | 52      |
| Lone Pine Republic, Wn.  | 275     |
| Octagon, Okanagan        | 1       |
| Quilp, Republic, Wn.     | 286     |
| Sally, Beaverdell        | 33      |
| Silversmith, Sandon      | 125     |
| Standard, Silvertown     | 172     |
| Surprise, Republic, Wn.  | 51      |
|                          | 9,918   |

### GERMAN POTASH INDUSTRY IN 1922

The 1913 German pre-war record of an output of 1,110,500 metric tons of pure potash was surpassed in 1922 by about 200,000 metric tons; that is to say, the production was about 1,311,500. In judging these statistics the output of Alsatian potash -- no longer German -- must be considered. Statistics for the years 1913 to 1921 show the following development:

| Year | Total output of pure potash Metric tons | Total value Paper marks | Average value per ton Paper marks |
|------|-----------------------------------------|-------------------------|-----------------------------------|
| 1913 | 1,110,500                               | 185,466,000             | 167                               |
| 1914 | 903,900                                 | 150,603,000             | 167                               |
| 1915 | 679,700                                 | 102,011,000             | 150                               |
| 1916 | 883,900                                 | 157,369,000             | 178                               |
| 1917 | 1,004,200                               | 218,460,000             | 217                               |
| 1918 | 1,001,600                               | 278,677,000             | 278                               |
| 1919 | 812,000                                 | 1,260,301,000           | 1,552                             |
| 1920 | 923,600                                 | 1,517,865,000           | 1,626                             |
| 1921 | 921,146                                 | 2,072,101,000           | 2,250                             |

At the beginning of 1923 the price of potash to German consumers, measured in paper marks, was about 800 times that of pre-war times.

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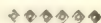
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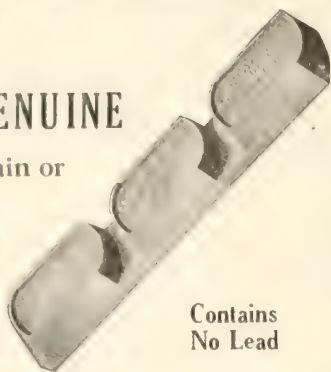
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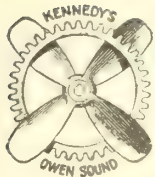


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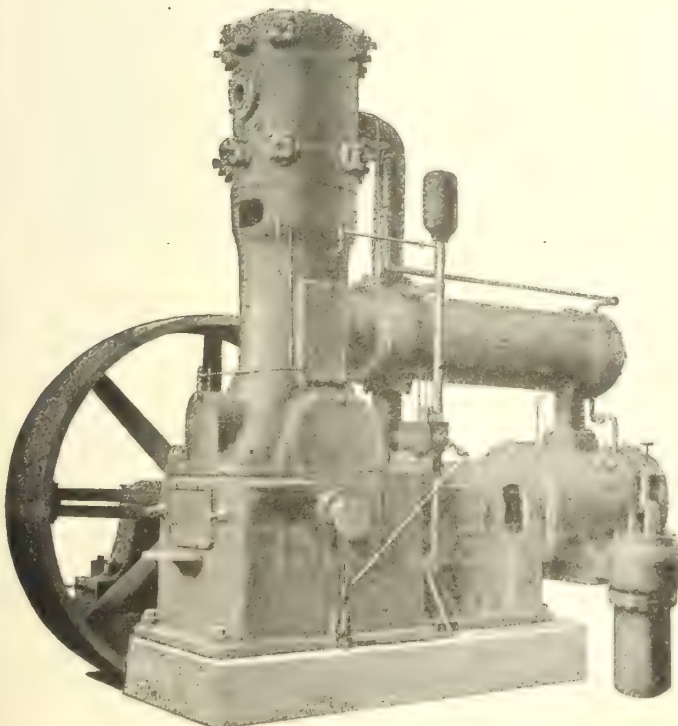
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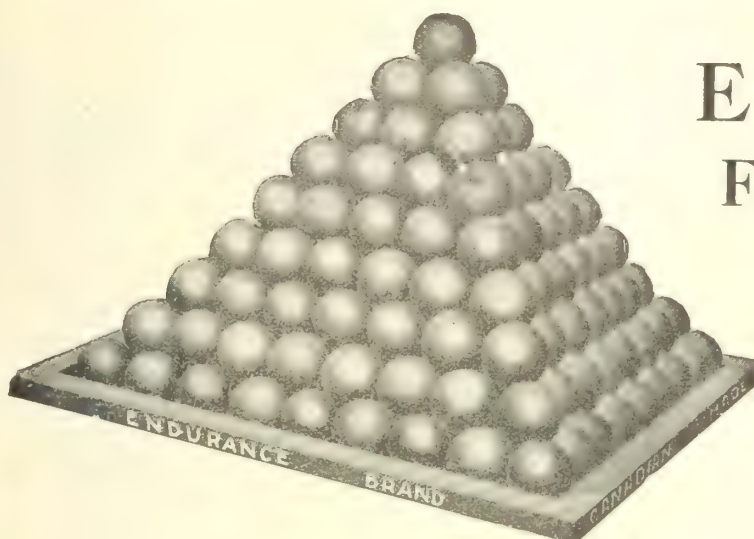
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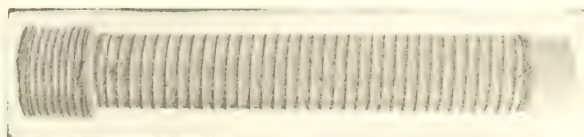
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# Minerals

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Ontario, with its 407,262 square miles, contains many millions of acres in which the geological formations are favorable for the occurrence of minerals, 70 per cent of the area being underlain by rocks of pre-Cambrian age. The phenomenally rich silver mines of Cobalt occur in these rocks; so also do the far-famed nickel-copper deposits of Sudbury, the gold of Porcupine and Kirkland Lake, and the iron ore of Magpie and Moose Mountain mines.

## Economic Minerals.

In addition to the above, practically all economic minerals (coal and tin excepted) are found in Ontario:—actinolite, apatite, arsenic, asbestos, cobalt, corundum, feldspar, fluor-spar, graphite, gypsum, iron pyrites, lead, mica, molybdenite, natural gas, palladium, petroleum, platinum, quartz, salt, talc and zinc. This Province has the largest deposits on the continent of talc, feldspar, mica and graphite.

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Preliminary returns show the output of the mines and metallurgical works of the Province for the year 1921 to be worth \$48,128,387, of which the metallic production was \$27,574,202.

The following figures show the rapid growth of Ontario's mineral industry by five-year periods since 1891:

| Year. | Value.      | Year. | Value.       |
|-------|-------------|-------|--------------|
| 1891  | \$4,705,672 | 1906  | \$22,388,383 |
| 1896  | 5,235,003   | 1911  | 41,976,797   |
| 1901  | 11,831,086  | 1916  | 65,303,822   |

## Dividends.

Dividends and bonuses paid to the end of 1921 amounted to \$23,140,734 for gold mining companies, and \$84,388,185 for silver mining companies or a total of \$107,528,919.

## Mining Regulations.

A miner's license costs \$5.00 per annum, and entitles the holder to stake out in any or every mining division three claims of 40 acres each. After performing 200 days' assessment work on a claim, patent may be obtained from the Crown on payment of \$2.50 or \$3.00 per acre, depending on location in unsurveyed or surveyed territory.

## Assay Office.

The Provincial Assay Office at No. 5 Queen's Park, Toronto, is maintained by the Department of Mines for the free identification of minerals, free assays under the provisions of the Mining Act of Ontario, and also for general assay work as per the Schedule of Charges which may be obtained on application.

## Temiskaming Testing Laboratories

The Department maintains, at Cobalt, an ore sampling and testing laboratory which is now prepared to receive parcels of gold ore from 100 pounds upward, and after sampling and assaying the same to pay to the shipper the value thereof, less treatment charges. The purpose is to afford a market for ores extracted by prospectors and others in developing their mining claims, enabling them to obtain funds which they can use for further work and to report on the most satisfactory method of treatment. Fuller information may be obtained on application to the Manager, Temiskaming Testing Laboratories, Cobalt, Ontario.

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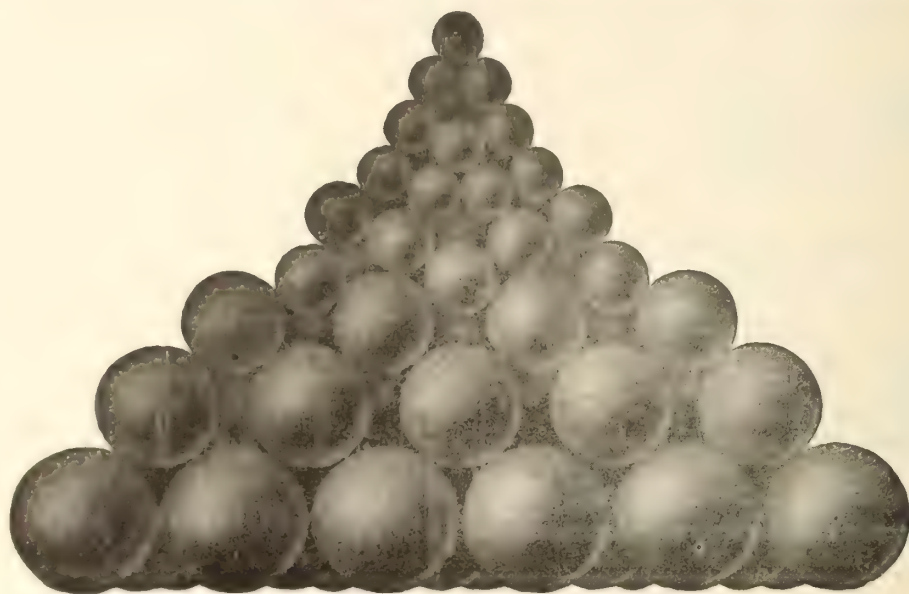
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Gardenvale, Que., June 15th., 1923

No. 24

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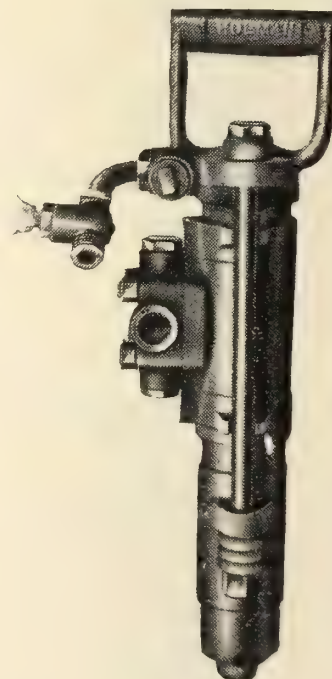
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## :-: EDITORIAL :-:

### REBUKE AND REWARD

If those of our readers who have preserved files of the *Canadian Mining Journal* will turn back to the issue of January 19th, 1923, page 56, they will see there a letter from Mr. Robert Holding. In this communication Mr. Holding administers a severe rebuke to a group of promoters who had been taking unwarranted liberties with his name. His letter is worthy of quotation *in extenso*. Here it is: — "My notice has been attracted lately to your articles on wild-catting, and the unscrupulous way in which mining companies are being organized for the sole purpose of milking the public. I have had more than my share of experience with one of these to which your article might have been meant to apply, and this might lead some people to believe that I am one of the principals in the undertaking alluded to.

"I refer to a newly organized company, under the name of 'Holding Consolidated Company, Limited'. I would like to clear myself of any unjust imputations by stating a few facts.

"I was the discoverer of the Holding mining claims in the West Shining Tree district and still hold 75 per cent interest in them. These claims were optioned to others, and I have had no hand in the incorporation of the company alluded to. I have endeavoured by every means possible to prevent any manipulation by which any person could be deceived.

"My claims were, and still are, under the incorporated name, Asquith Gold Mining Co. I had no knowledge of the Company mentioned above until I saw it in print."

An admirably outspoken and concise declaration, this.

And now comes the dramatic denouement. Evidently the promoters failed to put their scheme "across." A few days ago it was announced that Mr. Holding had disposed of his claims to Mr. R. J. Fleming (the well-beloved and heartily-hated former Traction Tsar of Toronto) for a good round sum. It transpires, also, that Mr. Holding, a vigorous octogenarian, seafarer and prospector, has sought his fortune in many far countries, and after numberless adventures by land and sea, has realized his dream of a modest competence. For once the gods have shown a sense of proportion.

The striking contrast between the plucky old gentleman (to whom we take off our last year's straw — perfectly cleaned) and those men who organize companies "for the sole purpose of milking the public", is a sermon that needs no rhetorical garnishings.

We extend to Mr. Holding the *Journal's* heartiest

hope that he will live long in the land that he has made his home. We also venture the further hope that Mr. R. J. Fleming may find mining a less costly avocation than amateur farming.

O, that Horace had done precisely what Mr. Fleming is doing!

### NEW BRUNSWICK COAL FOR QUEBEC AND ONTARIO

A Canadian coal district of modest productive capacity but with a favourable location for economic development is the Grand Lake area of New Brunswick, particularly in the vicinity of Minto, 70 miles north of St. John and 35 miles east of Fredericton. Until recently, when the Canadian Pacific Railway acquired holdings in the district, attempts to operate mines within this area were sporadic and on a small scale. Mr. Charles J. Coll is now in charge of the mining operations of the Minto Coal Company, and the output of the mines is increasing rapidly. The latest report of the Dominion Bureau of Statistics, giving coal production for February of this year, credits New Brunswick with an output of 25,000 tons, double that of a year ago, and most of this increase can be credited to the new activities round about Minto.

In evidence given last month before the Senate Committee on Fuel in Ottawa, Mr. W. B. Lanigan, General Freight Traffic Manager for the Canadian Pacific Railway, gave some facts about these coal mining operations. He said, in part: "We have a coal field at Minto, New Brunswick, and I may say that I have been trying to extend the market for that coal to the best of my ability. There is a big difference in hauling coal or any other commodity in the direction of your loaded traffic and filling empty cars to come back. We have a great many cars that go down to St. John in the winter time with grain, and if we can get something to put in those cars to bring them back with a load rather than empty, it is a more desirable and cheaper form of transportation than it would be to carry it in the opposite direction, the direction of your loaded cars.

"The Minto field is 841 miles from Toronto, and we made a rate of \$4.50 into Toronto for that coal. I don't think we carried any coal to Toronto, but we did increase the amount of coal we put into Montreal, into Ottawa, along the North Shore, and as far west as Kingston. I expect these Parliament buildings are heated with Minto coal. The rate to Montreal, a distance of 501 miles, is \$2.75, a little over half a cent per ton per mile, by using the return cars, available at St. John within a comparatively few miles of Minto."



The information available in the reports of the Geological Survey and other reports is summarized by Mr. F. W. Gray in his description of "The Coal-Fields and Coal Industry of Eastern Canada," published by the Mines Branch in 1911. Though thousands of square miles in New Brunswick are underlain by coal measures of Carboniferous age, containing in places thin seams of coal, the only promising part is that at Grand Lake, occupying an area of 112 square miles with an estimated content of 138 million tons.

The coal seam is thin, from 18 to 30 inches, and lies within fifty feet of the surface. The quality is good. A unique method of mining is employed to cope with these peculiar conditions. Shafts are sunk to work an area 800 feet by 600 feet and last about 18 months, when the equipment is moved on to a new block.

Though from the nature of the coal seams production from the Grand Lake field will never be very large, still, it constitutes a valuable local industry and, while helping the Canadian Pacific Railway to fill its empty west-bound freight cars, also aids in the solution of Canada's fuel problem.

### FIRST QUARTER'S PRODUCTION IN ONTARIO

The report of Ontario's mineral output for the first quarter of 1923 shows, in the main, a healthy condition in the youthful mining industry. The cramping effect of power shortage in Poreupine has cost the country numerous millions or dollars in delayed production of bullion; but private enterprise has at last overcome the forces of obstruction and the inertia of public administration, and when Hollinger has expended its three millions or so on the Abitibi River, many of the smaller mines will be able to add their quota to the enlarged production of the "big three".

The full effect of development in South Lorrain has not yet been felt in silver production, which is somewhat below that of 1922. With the Violet property of La Rose again producing and the new Colonial workings in good ore, the Cobalt camp should make a much better showing during the remainder of the year.

The outstanding feature of the year's progress so far is, of course, the recovery of the market for nickel. Though a large part of the renewed activity at the mines and smelters of the Sudbury district and at the refineries is due to the increase in general industrial activity, the initiative of the various managements in finding a wider market and in improving and adapting their products for multitudinous industrial uses must be credited with a substantial share of the success.

Lead now has an important place in Ontario's output of metals. This is due solely to the well-directed activities of the Kingdon Mining, Smelting and Manufacturing Company. The development of the mine at Galetta from the prospect stage and of the concentrator and smelter from their simple beginning to their present highly organized form afford an example of clean-cut and effective engineering and business management that

might well be used as a criterion by Canadian mining engineers. Those concerned in this development have earned the reward indicated in the official figures of production and value.

Iron ore is still conspicuous by its absence from the tables of production. Nor is any relief in sight from this intolerable situation. After the pending provincial elections are over, we may have some light thrown on the subject by the committee on iron ore appointed last July to examine all the evidence available. The business of smelting American iron ore in Ontario has been resumed on a very satisfactory scale; but that only emphasizes the opportunity that awaits us for using our own raw material.

### THE AIR FORCE AND AERIAL SURVEYS

The season's programme for the Royal Canadian Air Force has been announced. In addition to flights for the purpose of training, there will be a large number of flying hours allotted to various branches of the Government service. The Forestry, Water Power and Topographical Surveys and the National Parks Branches of the Department of the Interior, as well as the Departments of Public Works, Agriculture, Customs and Indian Affairs, will profit by this service. Photographic surveys will be made, survey parties and their supplies transported, fire patrols conducted. Altogether, this branch of the National Defence force will be put to a very valuable use throughout the summer months.

There is a gap in the list. Where does the mining industry come in? The mining industry must be the pioneer throughout the larger part of Canada and the mainstay of important areas. Its growth depends essentially upon exploration, much of it in areas that are still unmapped, or mapped with various degrees of vagueness and inaccuracy. Topographical maps of these areas would be of incalculable benefit to the prospectors and geologists who must toil through the woods on foot. An aerial survey is the cheapest and most satisfactory means of providing such a map.

Could not a small fraction of the flying hours available for the use of the various Government departments be used to aid the geologist and the prospector?

### WATER POWER

Canada's hydro-electric stations can supply 3,000,000 horsepower. The Water Power Branch estimates that by 1940, this figure will have reached 5,000,000. Mr. Julian C. Smith estimates that 20 or 25 years from now we shall have 7,000,000 horsepower developed. The coal equivalent of our present developed power is 26,700,000 tons a year, worth, at \$10. a ton, \$267,000,000. These and a wide range of additional facts and figures regarding our water-powers and their uses are cited in a noteworthy special number of the *Financial Times*, Montreal, issued last week.

The mineral industry consumes, directly, only a comparatively small part of this vast amount of hydro-



electric power. The energy, both human and mechanical, expended in the production of minerals is usually repaid on a far more generous scale than in other industries. In the metallurgical and allied industries dependent upon minerals for their raw material there is, however, an open field for the use of electrical power whose possibilities are vast, but impossible to gauge. A number of important electro-metallurgical industries already in operation will come to mind. These are merely on the borders of the field.

Canadian metallurgists have hardly got into their stride yet. The remarkably fine results they have attained in the comparatively few instances where they have applied themselves seriously impress one with the idea that when their numbers are increased and their scope enlarged, Canada will be known for the thorough quality and large size of her metallurgical industry. In this our hydro-electric power will play no small part. It is quite possible that, with the advance of metallurgical research, the minerals from many deposits, some already available and others still to be found, that are now of little or no use will be transformed to commercial commodities in somewhat the same way that limestone is now made into acetic acid at Shawinigan Falls.

### RESEARCH IN EVERY-DAY LIFE

"In an inland city two years ago, two bakers divided the bread trade between them on about equal terms. One was a college man, trained in chemistry and physics, who had gained an interest in a bakery through an unexpected inheritance. The other was a rule-of-thumb baker, who delighted in following the customs and instincts that had grown up slowly since the days of Noah and the ancient fathers of our race.

"To-day one of these bakers operates a plant that is a splendid exemplification of the work of the research chemist in the baking industry, while the other is blue and disconsolate. The bread in the plant of the man who believed in the chemist, rolls through automatic machines, nearly all of which were invented in response to needs discovered by chemical research. No hand touches it from mixer to wrapping machine. It passes through a 'foolproof' oven, in which a loaf simply cannot get out until it is properly baked, and the ingredients are subjected daily to chemical tests under a trained supervisor.

"It is the belief of the owner of this bakery that within ten years every baking superintendent will be a college man, with a technical training in the chemistry of fermentation. In his own plant the heart of the bakery is the chemist's laboratory, where ingredients are tested, weighed, and introduced into the bread mix with an exactitude of measurement never before thought to be necessary.

"To the chemist of this plant the housewife's 'pinch of salt' and the rule-of-thumb baker's 'small handful' become an abomination. Careful research, verified by the baking of thousands of loaves of bread in an exper-

imental bakery, has shown that just a pinch too much of salt or just a pinch too little will have a very marked effect in pulling down the quality of the baked loaf.

"In this bakery, too, a time clock has been installed. It is not a time clock for the purpose made famous by efficiency engineers in factories. It is a time clock in the dough room. It forces the baker to record the exact minute and second at which he took batches of dough from the mixers and the exact minute and second at which he 'punched' the doughs after the first fermentation in the troughs.

"This most recent work of the research chemists in stating the need for one new automatic machine after another to replace guess work and variable human judgment, oddly enough, is only a following along of the 'Open Sesame' to the secrets of fermentation discovered by Louis Pasteur."

These paragraphs commence a story, "The Earning Power of Research," in the current issue of *Industrial and Engineering Chemistry*. Many similar stories could be told, all pointing to the same conclusion, namely, that it pays — pays in cold hard cash — to know exactly what you want to do and precisely the most effective way of doing it, in any manufacturing process. Such a seeking and finding of information constitutes industrial research.

The term "research" still suggests a vague and distant ideal to many of us. The fact is that industrial research is mainly composed of applied common-sense, impelled to action by the same curiosity that "wants to see the wheels go round," and backed by a thorough training in the fundamentals of pure and applied science.

There are still many phases of both mining and metallurgy that have not yet profited by the use of organized scientific curiosity in the hands of a competent man. Many old methods are still retained in mine and smelter because of the reverence due their antiquity. The newer parts of our mineral industry have in the main escaped the results of this misplaced veneration; but hoary custom still rules in places.

The chemist-baker tells a story that all of us can note with profit.

In panning vein-matter for gold, the mortar and pestle are indispensable, as the sample must be well ground up before being panned, and every grain must go into the pan. As the gold in some deposits is so locked up in pyrite and other minerals that it does not separate in a pan, a sample should be first roasted (this can be done on a shovel) and ground before being panned. The sand and gravel of rivers that have crossed gold fields may pan gold, and, in this way, give an indication for prospecting up-stream.

Platinum is found associated with chromite in serpentine and peridotite rocks. Some large masses of platinum have been found, for example, one weighing 23 lbs. It is worth about five times as much as gold. It should be looked for in serpentine wherever the rock is mineralized, and particularly where chromite is found.



# LETTERS FROM SOUTH LORRAIN

## III. PROSPECTS AND PERSPECTIVE.

South Lorrain, because it is a resurrected camp, is in a position markedly different from that of a new mining camp. During the summer months steamboat service is available on Lake Temiskaming, the landing being four miles from Silver Centre by road. The road to North Cobalt and Haileybury is passable in dry weather. Thus Silver Centre, the heart of South Lorrain's small population, is easily accessible. The output of silver will—at a guess—exceed 3,300,000 ounces this year. Before long the re-vitalized district will be producing more silver annually than the mines of Cobalt. This seems certain. Meanwhile, as the summer goes on, men, machinery, and supplies will be needed in increasing volume. It is safe enough to predict that the population of South Lorrain, which is now about 300, will run up to one or two thousand before winter sets in. This means trade for the merchants of the nearest railway towns, traffic for the railway, and very timely replenishment of the diminishing annual supplies of silver and cobalt from Northern Ontario. In course of time, railway connection may be desirable. But, let me repeat, there is now the most glaring need of a macadamized wagon road. The outlay would be as bread cast upon the waters. The Government would gain an hundred-fold in revenue from the mines and from numerous other sources. All the good land between Cobalt and Silver Centre would be worked. Farming, stimulated by the new mining activities, is even now being carried on to a considerable extent along the lands served by the miserable Cobalt-Lorrain road; but it is not within measurable distance of its maximum.

One would have to be blind not to see the great possibilities of South Lorrain—and unvarnished not to admit seeing them. But it is not a region that invites surface prospecting. Heavy overburdens of boulder clay, sand, and gravel fill the depressions of the glacialized Archean hills. The valleys are either bedded with clay or occupied by lakes. Therefore most of the exploratory work that is being done is taking the form of diamond drilling (chiefly for formation) and shaft sinking, all of which involves the well-directed expenditure of much money. It is more than probable, therefore, that the future of the district lies in the hands of established mining companies to a large extent, and, to a lesser degree, in those of new companies that are amply financed.

Putting it briefly, South Lorrain will be developed by the geologist, the mining engineer, and the financier. The prospector has already done his bit. The stabilizing influence of the two operating companies, the precedents of sound methods set by them, are proving invaluable.

To paraphrase the good old lines, South Lorrain is a district.—

"Where many a prospect pleases

"And only man is vile."

Never in Canada has there been less excuse for hydrous promotions. The bare facts are abundantly good enough. Moreover, the seeker after sound advice can get it more readily than ever before. Much light is being thrown

upon the ore deposits, their character and their vagaries, by Mr. C. W. Knight's present investigations. The map compiled by Mr. A. G. Burrows and his assistants in the year 1910 is an excellent general guide. To ascertain the standing of any mining undertaking in this region, to get a humanly fair idea of the possibilities and probabilities of success, is an easy matter for the well-informed investor. The "average" small investor, however, has no idea how to go about getting this information. It would greatly assist all investors and it would strengthen the hands of legitimate promoters and operators, if the Ontario Department of Mines issued interim reports. It would be still better if the Department gave definite and definitive statements through the press, relating to economic possibilities and progress, and embodying warnings, tacit or outspokenly specific, against the flimflammer. In the circumstances this is a first duty of the Department. The public will listen. Any such rational preventives are infinitely more effective than "Blue Sky" laws. The latter can never take the place of timely publicity.

\* \* \*

The area of probable enrichment in South Lorrain may be larger in acreage than the corresponding area in Cobalt. This gives one pause. The younger camp is getting away to a better start. There should be fewer blunders made and fewer blanks drawn in South Lorrain than in Cobalt. The essential geological likeness of the two areas makes South Lorrain the heir to all the practical wisdom gained in the older camp.

The kinship between the ore deposits of Cobalt and South Lorrain is that of the closest family relationship. The general mineral association is the same. As has been indicated above, the vein enrichments occur close to, but not actually at, the contacts. This is especially the case when branching veins become consolidated into one main vein. There are, however, one or two observable differences. These may be summed up as follows:—

1.—Whilst the principal known ore-shoots in South Lorrain occupy fractures in which pronounced faulting has taken place, the pronounced faults at Cobalt are almost always devoid of ore-shoots.

2.—In South Lorrain, more especially in the Keeley workings, there is marked, deep-seated oxidation, reaching depths of at least 500 feet, beneath and surrounding which there are found secondary ores of silver obviously derived from the leached material above.

\* \* \*

A few words of appreciation are due the managements of the Keeley and the Frontier. At both mines there is the closest watch kept on daily and, for that matter, hourly, results. There is no evidence of the wastefully disproportionate overhead charges that often are the curse of successful mines. Mine maps, assay plans, and daily records are kept up-to-date. Supervision and direction are as they should be—efficient and unobtrusive. Mining geology is a recognized factor in daily progress. Accommodation for the men is good, the commissary departments are more than good.

Ville Marie, Province of Quebec, is not close enough to



# Progress of Continental Mines

SILVER ORE ON COLONIAL PROPERTY, AND  
PLANS TO OPEN UP KIRKLAND AREA

BY THE EDITOR

The events of the past few weeks at the Colonial property of Continental Mines have been the most momentous in the Cobalt camp for years past. The new shaft, sunk to the diabase-Keewatin contact, a distance of 950 feet, since this company took over the property a year ago, has opened up ore that is not only wonder-

that now supplies the world with the larger part of its gold.

The Colonial and Violet properties adjoin the O'Brien Mine on the east. To the east again of the Colonial is the Silver Cliff, also held by Continental Mines. On the O'Brien property there outcrops the contact, with the underlying Keewatin rock, of the diabase sill whose intrusion induced the forming of all the Cobalt silver veins. It is at or near the contacts, upper and lower, of this sill with the intruded rocks that the silver deposits are found. On the O'Brien property exceedingly rich veins were found outcropping along this lower contact zone, and they have continued far underground, dipping eastward with the contact. On the Silver Cliff property to the east there is a small remnant of the Keewatin rock that originally covered the diabase sill at this place, and in it and the adjoining diabase rock there were found numerous shallow silver veins, to treat the ore of which the Silver Cliff mill was built. On the King Edward property to the south a diamond-drill hole showed the lower contact to be at a depth of 1,150 feet. Apart from this drill hole and the mining development following downward from the outcrop, on the O'Brien and the Violet claim, the new Colonial shaft is the first serious attempt to explore this large area of the lower contact, which holds out such promise



New Colonial Shaft, looking southeast. The diabase-Keewatin upper contact occurs near the top of the hill in the background.

fully rich, but exceeds in its extent, so far, the most sanguine expectations. If further lateral exploration of this contact should show that this ore is of wide spread occurrence, as may reasonably be expected, the capacity for production of Canada's famous silver camp will be greatly increased.

It has required the courage born of conviction to spend well over \$150,000 for a shaft to open up this ground for exploration. This conviction was based on a thorough examination of all the facts available, and logical scientific deduction from these facts. A similar course of reasoning led some of the owners of outcrop mines on the Rand to sell their holdings, buy "deep" holdings, and sink shafts to the buried reef

affect the stability of the popular centre of gravity, nor is it hopelessly and aridly remote.

A generation hence, when history shall have been written, I fancy that South Lorrain will be described as having proved a brilliant successor to its brilliant predecessor, Cobalt.

J. C. MURRAY.



Vein at 935-foot level of Colonial shaft. The face shows ore to a width of 9 feet, giving assays averaging 20 to 100 ounces across that width, exclusive of the calcite vein in the centre which is composed of high-grade ore running several hundred ounces to the ton.



to the gold speculator. Indeed the published conclusions of Mr. C. W. Knight, of the Ontario Department of Mines, after his recent thorough geological study of the Cobalt camp, are so clear cut and decided that no one need hesitate in exploring in a comprehensive way the low content of the diabase sill, in favourable localities, can be sunk almost as an investment.

The accompanying photographs were taken a month ago. Since that time underground development has



Silver Cliff mill, on Cross Lake, east of the Colonial Mine.

proceeded steadily, and soon there will be sufficient ore developed to warrant the operation of the mill on the Silver Cliff property.

At Kirkland Lake the plan of operations of Continental Mines has been equally far-sighted and comprehensive. During the nine months of their ownership of the eastward extension of the "main break," they have conducted a thorough examination of some of the more promising localities and have sunk a shaft 150 feet on the northern of two shear zones or "lines of break." This shaft has disclosed some very interesting gold ore. As it was sunk by hand drilling and horse-power, it has not been possible to push development rapidly in order to explore the shoots of ore indicated in the



Temporary building, headframe, and horse-whim on Post Claim of Continental Mines, Kirkland Lake, on May 9th. South of this prospect shaft the new shaft will be sunk.

shaft. Now, however, arrangements have been made for an adequate supply of hydro-electric power, and progress in this shaft and in drifts from it will be rapid.

The southern shear zone, a thousand feet away, which is considered by some to be the "main break," has not yet been seriously examined within the Continental's holdings. It has been decided to commence immediately a 600-foot shaft on it, from which exploratory drifts will be run 1500 feet east and west along the "break" with a view to exploring thoroughly its possibilities. The western producing end of the Kirk-

land gold belt has yielded such handsome returns as a result of underground exploration of this sort, that the group of mining engineers who are backing and directing the Continental operations are confident they will develop a mine or two on their end of the belt by adopting similar means.

The mining fraternity in Canada will watch with interest the progress of Continental Mines in their ventures at Cobalt and at Kirkland Lake; and it may be that the results will open out a new vista for those who wish to direct the development of Canada's mineral resources in a sound and comprehensive way.

## PERSONAL AND GENERAL

Mr. W. R. Rogers is in Porcupine for the week, to see the detailed topographical mapping for Mr. A. G. Burrows' new map sheet well commenced.

Dr. R. B. Moore has resigned his position as chief chemist and mineral technologist with the United States Bureau of Mines to take charge of the development department of the Dorr Company at their New York office. Dr. Moore has had an unusually varied and successful experience with non-metallies and some of the rare metals, and was especially concerned during the war years with helium and radium recovery.

Mr. Dan Lindeborg, pioneer prospector and mine operator, has passed through Vancouver en route to Stewart after wintering at Honolulu. He is the owner of the Big Missouri claims, under bond to the Trites-Wood-Wilson syndicate.

Mr. J. J. McDougall, assistant general manager of the Acadia Coal Company, Stellarton, paid a flying visit to Cape Breton recently in connection with the business of his company.

Mr. John S. Whyte comes back to the Dominion Coal Company to fill the position of Chief Engineer, recently vacated by Mr. Karl H. Marsh. Mr. Whyte was formerly electrical and mechanical engineer and was transferred to the Acadia Coal Company, Stellarton. He has received a warm welcome to Glace Bay where he is well known. He has the advantage of knowing the plants he will now supervise.

Mr. Thos. Riggs, vice-president of the Continental Mines, has been visiting the company's properties in Cobalt and Kirkland, accompanied by Mr. Shonnard, of the firm of Shonnard & Company, New York brokers, who had charge of the issue of Continental stock.

Mr. H. S. Denny is at present in the gold district of Northern Ontario, in the interests of his London associates.

Dr. C. V. Corless sailed for England last week.

## LEASED GOLD AREAS IN SOUTH AFRICA

The Government of South Africa owns certain productive areas in the Rand. One of these, the New State Areas, was leased five years ago to a company of that name, which has spent £1,800,000 in developing the gold-bearing reef underlying the property and building a 600,000 tons a year mill, recently put into operation. The famous Modderfontein Government Areas mine is another leased property, and there are a number of others, from all of which the Government derives a handsome revenue. Recently a new area, the Geduld East, was offered for lease, but no tenders were received. It is said that, for an unproved area, however promising, the terms of lease are now too onerous and the conditions of tenure, owing to the possibility of a Nationalist-Labour government, too uncertain to attract capital. It is estimated that £1,850,000 would be required to prove and then to equip the property.

# Metalliferous Production of Ontario

## RETURNS FOR FIRST QUARTER OF 1923

Returns received by the Ontario Department of Mines from the metalliferous mines, smelters and refining works of the Province for the three months ending March 31st, 1923 are tabulated below. For purposes of comparison the quantities and values are given for the corresponding period in 1922. Tons throughout are net tons of 2,000 pounds.

### ONTARIO'S METALLIFEROUS PRODUCTION — FIRST QUARTER OF 1923

| Product                   |        | Quantity  |           | Value \$  |           |
|---------------------------|--------|-----------|-----------|-----------|-----------|
|                           |        | 1923      | 1922      | 1923      | 1922      |
| Silver                    | ounces | 2,729,749 | 2,958,094 | 1,792,876 | 1,980,099 |
| Gold                      | "      | 213,263   | 226,176   | 4,373,513 | 4,675,475 |
| Platinum metals           | "      | 20        | .....     | 1,740     | .....     |
| Copper (Metallic)         | lbs.   | 2,872,540 | 22,553    | 460,441   | 1,310     |
| *Copper in matte exported | tons   | 549       | 5         | 109,875   | 897       |
| *Nickel in matte exported | "      | 1,270     | .....     | 507,836   | .....     |
| Iron, pig (**)            | "      | .....     | 7,261     | .....     | 178,530   |
| Cobalt metallic           | lbs.   | 84,639    | 21        | 205,459   | 75        |
| Cobalt oxide              | "      | 135,923   | 75,505    | 268,241   | 157,906   |
| Nickel oxide              | "      | 3,140,298 | 25        | 451,213   | 7         |
| Nickel, metallic          | "      | 4,761,768 | 522,184   | 927,406   | 129,055   |
| Nickel-cobalt compounds   | "      | 234,712   | 329,274   | 74,186    | 68,093    |
| Lead, pig                 | "      | 1,003,633 | 638,989   | 69,067    | 35,875    |
| Total                     |        |           |           | 9,241,853 | 7,227,322 |

\* Copper valued at 10¢ in matte form and nickel at 20¢ in 1923.

\*\*Total output of pig iron was 102,515 tons worth \$2,745,605. Figures in the table represent proportional product from Ontario ore smelted.

### Gold

Although Ontario's gold output for the first quarter of 1923 was exceeded by that of 1922, the reduction is entirely due to hydro-electric power shortage. The snowfall was light in the early winter, and all small feeders in the drainage basin were frozen solid. This situation followed by a late spring had the effect of greatly curtailing milling operations at Porcupine. Additional power from Sturgeon Falls on the Mattagami river and Indian Chute on the Montreal river, will provide additional energy. Details of production are given hereunder:

| Source                             | Milling Capacity<br>Tons<br>(Daily) | Ore Milled<br>Tons | Gold Recovery |           | Silver Recovery |          |
|------------------------------------|-------------------------------------|--------------------|---------------|-----------|-----------------|----------|
|                                    |                                     |                    | ounces        | Value \$  | ounces          | Value \$ |
| PORCUPINE                          |                                     |                    |               |           |                 |          |
| Clifton-Porcupine .. . . .         | 35                                  | 920                | 122           | 2,521     | 37              | 23       |
| Dome .. . . .                      | 1,200                               | 79,900             | 49,470        | 1,023,050 | 8,409           | 5,514    |
| Hollinger Consol'd .. . . .        | 4,500                               | 290,786            | 106,946       | 2,210,770 | 17,562          | 11,419   |
| McIntyre .. . . .                  | 1,000                               | 43,278             | 23,271        | 481,064   | 4,226           | 2,946    |
| Total                              | 6,735                               | 414,884            | 179,809       | 3,717,405 | 30,234          | 19,902   |
| KIRKLAND LAKE                      |                                     |                    |               |           |                 |          |
| Kirkland Lake Proprietary .. . . . | 125                                 | 1,803              | 580           | 11,984    | 294             | 190      |
| Kirkland Lake .. . . .             | 750                                 | 14,665             | 3,405         | 70,384    | 483             | 316      |
| Lake Shore .. . . .                | 60                                  | 3,582              | 6,137         | 126,859   | 432             | 283      |
| Teck-Hughes .. . . .               | 160                                 | 9,028              | 11,847        | 265,582   | 806             | 610      |
| Wright-Hargreaves .. . . .         | 240                                 | 18,977             | 10,308        | 177,766   | 1,072           | 84       |
| Total                              | 735                                 | 50,055             | 33,277        | 652,575   | 3,087           | 1,988    |
| Nickel-Copper refining .. . . .    |                                     |                    | 177           | 3,533     |                 |          |
| GRAND TOTAL                        | 7,470                               | 464,939            | 213,263       | 4,373,513 | 33,321          | 21,885   |

In addition to the values above quoted, gold mining companies received a premium on exchange totalling \$15,745.

### Silver

Production for the quarter shows a small decrease from the 1922 figures, explained in part by the absence

of shipments from Gowganda by the two leading producers, Miller-Lake O'Brien and Castle-Trethewey. South Lorrain is producing at an increasing rate, the shipments from the Keeley and Frontier being 826,775 ounces of silver in addition to cobalt. The T. and N. O. Railway reports shipments of ore and concentrates as follows: to Ontario refineries, 523 tons and 247 tons to

the U. S. The average price of silver for the quarter was 65.845 cents per ounce as compared with 65.06 cents in 1922. Mines shipping over one-quarter million ounces follow in order; Nipissing 910,980 ounces, Keeley 530,174 ounces, Mining Corporation 310,697, Frontier 296,601, Coniagas 268,374. Mines report payment for 132,222 pounds of cobalt. Details of silver output are:

|                                 |                |                   |
|---------------------------------|----------------|-------------------|
| Cobalt, South Lorrain, etc. . . | 2,685,077 ozs. | Value \$1,763,522 |
| Recovered from gold refining    | 33,321 ozs.    | Value 21,885      |
| Recovered from Nickel-copper    | 11,351 ozs.    | Value 7,469       |

Total . . . . . 2,729,749 ozs. Value \$1,792,876

**Refineries:** South Ontario silver refineries at Deloro and Thorold treated 1773 tons of ore, concentrates and

residues during the quarter. Nickel-cobalt compounds include unseparated oxides and residues marketed. Production of nickel oxide and metallic nickel is insignificant as compared with the output from nickel-copper refineries. In addition to the items noted in the table, 660 tons of white arsenic worth \$154,069 were



marketed, the Deloro company operating a plant for the manufacture of insecticides.

#### **Nickel and Copper**

Production from the Sudbury area is on the increase following the post war depression. The Mond Company has a plant at Clearfield Pa., for the production of malleable nickel, and the International Company now operates at Huntington, W. Va., a rolling mill for nickel and monel metal products. The industrial uses of nickel are rapidly expanding. In April an announcement was made that mine, smelter and refinery of the British America Nickel Corporation would be soon placed in operation after a prolonged shut down. During the period the Mond and International companies smelted 192,118 tons of ore and produced 10,748 tons of nickel-copper matte. The Mond Company made no shipments, but the International shipped 2,271 tons of matte to Huntington, W. Va. and 6,234 tons to Port Colborne, Ont. At the latter plant 6,764 tons of matte were treated. The price of electrolytic copper on the New York market averaged 15.56 cents per pound for the period as compared with 12.96 cents in 1922.

#### **Iron Ore and Pig Iron**

The only iron ore shipped during the period was a consignment of 307 short tons of briquettes by Moose Mountain to Welland, Ontario. No Ontario ore was smelted in blast furnaces, consequently the Province is not credited with any pig iron production in the table. The Steel Company of Canada had a considerable tonnage of Moose Mountain briquettes on hand at the end of the quarter to be smelted later in connection with the experiments being conducted by the Ontario Iron Ore Committee.

During the quarter two blast furnaces at Sault Ste. Marie and two at Hamilton were operated. In the month of April another stack at Sault Ste Marie was blown in, also one at Port Colborne. Foreign ore totaling 194,091 short tons was smelted, the output of pig iron being 102,515 tons worth \$2,745,605. In steel making 62,241 tons of pig were used and 66,459 tons of scrap iron were used for the production of 115,967 tons of steel, valued at \$4,114,074.

#### **Lead**

The average New York price for pig lead was 7.98 cents per pound as compared with 4.71 cents for the corresponding quarter in 1922, and there was an increase in output as noted in the table. Early in the year the Kingdon Mining, Smelting and Manufacturing Company at Galetta on the Ottawa river placed in commission a new blast furnace for the treatment of slags and flue dust which had accumulated from Scotch hearth smelting of lead concentrates. The Company is now in a position to handle customs ore.

### **NO STRIKE IN NOVA SCOTIA**

The coal mines of Cape Breton, after conferences with officials of the Dominion Coal Company, have decided not to press their claim for a return of the 1921 wage rate. They will abide by their present contract, according to all indications. The steel workers have likewise decided not to strike for the 20 per cent increase in wages and the check-off they had demanded from the British Empire Steel Corporation. The recent voluntary increase of 10 percent in their wages no doubt affected their decision.

The output of the Dominion Coal Company's mines in Cape Breton during May was 310,000 tons, an increase of 103,000 tons over May, 1922. No. 2 Colliery had the largest individual output, with 61,000 tons.

### **ONTARIO DEPARTMENT OF MINES GEOLOGICAL FIELD PARTIES, 1923**

The geologists attached to the staff of the Ontario Department of Mines will be engaged in field work during the present season as follows:

#### **Permanent Officers**

(a) Mr. C. W. Knight, completing the geological examination of the underground geology of Cobalt and South Lorrain.

(b) Mr. A. G. Burrows, continuing his detailed mapping of the productive part of the Porcupine Gold Area. Some detailed topographical mapping is being undertaken at Porcupine by Mr. F. M. Smith, who is attached to Mr. Burrows' party.

(c) Mr. P. E. Hopkins is working in areas adjacent to Kirkland and Larder lakes. His map including the area between Swastika and Larder Lake will be issued during the present summer.

#### **Temporary Assistants**

1. Dr. Bruce Rose, lecturer in the Depts. of Geology and Mineralogy Queen's University, is assisting Mr. A. G. Burrows for a fortnight in June, and will later examine the area west of Lake Nipigon and south of the Canadian National (Transcontinental) Railway. He will accompany the survey party of Lang and Ross, of Sault Ste. Marie, who are running base and meridian lines in the District of Thunder Bay.

2. Dr. E. L. Bruce, Professor of Mineralogy at Queen's University, is in charge of a party making an examination of the Red Lake area in the District of Patricia. Dr. Bruce made a rapid survey of this area last season and a preliminary map will be issued in the near future. Before the conclusion of the season's work he will complete his survey of the English River, which was carried from Lac Seul to the mouth of Wabigoon river last season.

3. Mr. E. W. Todd of the Department of Mineralogy of the University of Toronto is in charge of a party examining the area northeast of Penhorwood township on the former Canadian Northern Railway. This area lies S. W. of Porcupine and west of the townships examined by Mr. Todd last season.

4. Mr. R. G. McConnell, former Deputy Minister of Mines at Ottawa, is completing his examination of the area adjacent to Sault Ste. Marie. Two seasons have already been spent on this work.

5. Mr. J. P. Johnson, a graduate of Toronto University, is attached to the survey party of Phillips and Benner, who are running a meridian in Thunder Bay District from Allanwater station on the Transcontinental Railway north to the easterly end of Lake St. Joseph. This party is also running a base line in the vicinity of Lake Savant.

### **CANADA'S MINERAL PRODUCTION**

The Dominion Bureau of Statistics has just issued its final report on the mineral production of Canada during 1921. It is, of course, much more comprehensive than the preliminary reports that have preceded it, and includes a vast amount of data, logically and conveniently arranged. The scope of the report in its present form is much wider than when it was published by the Department of Mines, and there is no doubt that the compilation in the first instance of the vast amount of information required for the tables that fill more than half the 233 pages accounts adequately for the unusual delay in publication. The volume is a credit to Mr. Cook and his staff on the Mining, Metallurgical and Chemical Branch.



# Northwest Mining Convention

SUCCESSFUL MEETINGS IN SPOKANE

No more convincing proof of the renewed health and life of the mining industry in the American Northwest could be obtained than is furnished by the outstanding success of the 28th Annual Northwest Mining Convention held at Spokane, Washington, from the 22nd to the 25 of May inclusive. Delegates were in attendance from the States of Oregon, Washington, Idaho and Montana and from the Province of British Columbia and the Yukon. General attendance aggregated, according to conservative estimates, at least 75,000 people, which indicates that in the City of Spokane and the adjacent district interest in mining is not confined to those directly identified with the business. In the past there have rarely been more than 75 properties represented in the exhibits; on this occasion there were 200 from British Columbia alone. Incidentally, the Canadian display captured the first prize.

## The Mineral Exhibits

Frank C. Bailey, the secretary, stated that there were some 10,000 specimens of ore in the exhibit, which was centrally located under the Milwaukee viaduct at Howard Street. The Coeur d'Alene mines were represented by large pieces of galena and other ores from the Bunker Hill, Hecla, Hercules, Morning, Tamarack & Custer, and Success mines, as well as from others. The Bunker Hill Smelter displayed bullion, and lead pipes from 3 to 12 inches in diameter among other products. The British Columbia Chamber of Mines showed samples from 200 properties in western British Columbia and the Yukon, while the eastern sections of the Province were well represented by exhibits assembled by the Associated Boards of Trade, the Prospectors' Associations, and other organizations, and taken to the Convention by Fred A. Starkey and associates, of Nelson and Cranbrook, B. C. In the centre of the hall was a very large piece of ore, labelled as containing 100 ounces of silver to the ton, taken from the Argentine Mine, Wallace, Idaho. A smaller sample from the same mine was said to carry 1,000 ounces silver to the ton.

Tuesday, the 22nd May, was Washington Day, and proceedings opened with F. A. Ross, vice-president of the Mining Association in the chair. A welcome was extended by Mayor Fleming, of Spokane, and by George Phillips, vice-president of the Spokane Chamber of Commerce. C. A. Towne, publicity director of the Anaconda Copper Co., told "What Mining Means to Montana", giving figures showing the influence of copper and its production by his Company on every citizen of the State of Montana. J. F. Callbreath, secretary of the American Mining Congress, in a discussion of transportation tariffs and taxation, urged that taxation should be based on the production of mines and not on their mineral content. Frank E. Woodside, of the B. C. Chamber of Mines, extended greetings from Canada. In the evening the delegates and visitors were entertained by moving pictures of the Anaconda Copper Company's operations.

## Technical Papers and Addresses

It was "Idaho Day" on the morning of the 23rd May and the programme consisted of addresses on "The

Silver Situation" by Dean F. A. Thomson, of the University of Idaho; "Recent Improvements in Flotation" by A. W. Fahrenwald, ore dressing engineer, U. S. Bureau of Mines; "The Metal Mining Outlook in Idaho" by Stewart Campbell, State Mine Inspector; and "Congressional Legislation" by Ravenel MacBeth, secretary Idaho Mining Association. Mr. Fahrenwald advised the engagement of a specialist in determining methods and equipment to be used, even if this meant an increase in costs. Mr. MacBeth stressed the difficulty of educating Congressmen to the needs of mining. Few mining men were appointed to congressional mining committees and the knowledge of the average congressman on the subject was extremely limited. The industry depended on Western senators to block injurious legislation. Ambassador Poindexter had been highly valuable to the industry while in the United Senate. L. O. Howard, dean of the mining faculty, Washington State College, said that mining had been handicapped by "blue sky" laws, taxation and railway freights. It had made important gains in the last year but lacked much of being in the position it occupied in 1914. He found conditions that encouraged him to believe it was entering on a long period of improvement.

"Oregon Day", to which was devoted the afternoon session, witnessed first-class addresses on mining conditions in that State. The contributors included Warren D. Smith, of the department of geology, University of Oregon, on "Mining Resources of the Baker District"; R. M. Betts, manager of the Cornucopia Mines Co. on "The Cornucopia District"; H. E. Hendricks, editor of the *Baker Herald*, on "Mines of the Baker District"; and J. P. Winter, of Portland Ore., on "Smelting Enterprises of Eastern Oregon."

## British Columbia

Thursday was the big day of the Convention. Affairs of the State of Montana were discussed in the forenoon, while British Columbia was in the limelight in the afternoon. Hon. Wm. Sloan, Minister of Mines, spoke for the Province, giving figures showing the progress made in 1922 in point of output as compared with previous years and sketching the developments of the past twelve-month. His tone was optimistic throughout and his prediction of increased output was enthusiastically received. A. G. Langley, resident mining engineer for the Government in the Kootenays, gave details of mining conditions in that part of British Columbia, and F. A. Starkey and other speakers from north of the line were heard and closely followed.

"Blue sky" legislation received another blow at the hands of Mr. Callbreath, who declared that it had an adverse effect on the development of natural resources. Other speakers included Douglas Lay, Manager of Le Roi No. 2, Rossland, B. C.; Frank E. Woodside, of Vancouver; Sidney Norman and Frank A. Ross, of Spokane.

A number of resolutions were adopted. One condemned the U. S. Treasury authorities for shifting 14,500,000 ounces of silver into subsidiary coinage. Another recommended the killing of the Denison "Blue sky" law before its introduction at the next Session. A



third suggested that the removal of the Alaskan land location office from Juneau to Anchorage remain in abeyance until conditions are investigated by President Harding on the occasion of his visit to that territory this summer.

### Prospecting

Friday, the 25th May, was devoted to miscellaneous business the greater part of the formal proceedings being concerned with the subject of "Prospecting." In this connection an informative address was delivered by R. W. Meldrum, of the Spokane University, while J. W. Mulholland, one of British Columbia's pioneer prospectors and mine operators, talked on what he described as "The World's Greatest Unexplored Free Milling Area." Mr. Meldrum stated that the prospector was the pioneer of all countries and he portrayed the work he had done in India, Australia, Africa, New Zealand and other countries. Mr. Mulholland declared, without qualification, that the "Greatest Unexplored Free Milling Area" was British Columbia and he gave many facts in substantiation of a statement which many might consider somewhat sweeping.

### Bolshevists Propaganda Exposed

Mr. Callbreath, secretary of the American Mining Congress, referred in strong terms to the activities of Bolshevists, parlor and organized, in the country. His remarks, he said, were inspired by the press dispatches, one of which told of the endorsement by a newspaper organization of a movement to "curb the usurpation of power by the United States Supreme Court" and the other of the plan of former U. S. Senator Frelinghuysen "to organize a league to limit the powers of coal companies and to force them to publish facts on the costs of production and distribution." Mr. Callbreath declared that "the attack on the Supreme Court is general among all parlor and organized Bolshevists. While some of them are patriotic, they do not realize what they are trying to do. Senator LaFollette, before the American Federation of Labor last year, said that Congress by re-enactment of a law might nullify the action of the Supreme Court by declaring it unconstitutional. If Congress is supreme in the making of law it might make law perpetuating its existence indefinitely. You have then created a monster autocracy, and if you assume that Congress is to be supreme and the full judge of its constitutional acts, then there is no Constitution. Instead of a Constitution you have a floating raft on a sea of shifting prejudices."

### ZINC SMELTER SOLD

It is reported that the National Smelter Works at Avonmouth, which were erected by the Government during the war at a cost of £3,000,000, but which were never utilized for the intended operations, have been sold to Baldwins Ltd. The buyer, it is understood, aims to realize the original plan of importing Australian ores or concentrates direct and of carrying out at Avonmouth—probably in conjunction with the existing Swansea concern—the processes of roasting or calcining required for their conversion into spelter.

### CYANAMIDE IN ITALY

Italy's production of calcium cyanamide rose from 16,000 tons in 1921 to 33,422 tons in 1922, and it is estimated that in 1923 it will be 40,000 tons. It is used principally as fertilizer. The fixation of atmospheric nitrogen by this means has distinct possibilities in Canada on account of the availability of cheap hydro-electric power.

### SLATE

"The Characteristics of Slate" is the title of a paper to be presented by Dr. Oliver Bowles at the meeting this month of the American Society for Testing Materials in Atlantic City. It gives a succinct account of the origin of slate, its valuable properties, its principal uses and suggested standards and tests.

Though slate has its origin in beds of clay, it has very little clay in it when it is of good quality. A typical slate contains the following minerals;

|                           |           |
|---------------------------|-----------|
| Mica (sericite) . . . . . | 38 to 40% |
| Chlorite . . . . .        | 6 to 18%  |
| Quartz . . . . .          | 31 to 45% |
| Hematite . . . . .        | 3 to 6%   |
| Rutile . . . . .          | 1 to 1½%  |

The crystals, most of them tabular, are arranged in a parallel position, and this gives rise to the slaty cleavage. It is of medium hardness, is very fine grained, is of low porosity, has great strength and is very resistant to weathering and many chemicals. The chief colours are grey, black, green, red, purple and mottled.

The uses of slate are manifold, and are increasing rapidly as its properties become better known. The principal uses are for roofing, electrical switchboards, blackboards, steps, toilet enclosures, etc. Only slate with a high degree of electrical resistance should be used for switchboards.

Slate splits most easily while the "quarry sap" is still in it. Sometimes it contains minerals soluble in water or weak acid solutions, which causes it to weather easily. The colour is sometimes fast, and sometimes alters on exposure to the weather, the former usually due to the presence of the stable oxides of iron, and the latter to the weathering of grains of carbonates or of pyrites.

Dr. Bowles suggests the following standards for slate:

**Roofing Slate.** — 3/16 inch minimum thickness is recommended. The adoption of a small number of standard sizes is not recommended, as a large number of sizes allows of the sheets of slate split from the blocks being used to the best advantage; much more trimming and loss of slate would result if there were fewer standard sizes. It is suggested that the present descriptions of colour, which are difficult for the user to understand, should be made plain to all. A three-inch lap is recommended as the standard for roofs. Durable nails should be specified.

**Structural Slate.** — For sanitary uses, the porosity should be specified. For strength and abrasion more investigation is needed before standards can be adopted.

**Blackboard Slate.** — It is estimated that only 10 percent of a quarry's product will make blackboards, and only 10 percent of these are flawless. Therefore a specification must take cognizance of this fact, lest a rigid standard make the price too high.

**Electrical Slate.** — "There is urgent need of the establishment of definite specifications and standard tests for electrical slate." It is stated that an apparatus suitable for conducting tests at the quarry is now available. Much experimented work remains to be done before a rational set of standards can be formulated.



# Power for The Mineral Industry

HYDRO-ELECTRIC GENERATING STATIONS IN  
NORTHERN ONTARIO GIVE 100,000 H. P.

(From *The Financial Times*)

The foundations of the mining industry of Northern Ontario consist of: large and rich mineral deposits; convenient location and transportation facilities; ample power for mining operations. The presence of these factors in Northern Ontario, together with a market for the products has given rise to its prosperous mineral industry. The central electric stations distributing power for mining purposes in Northern Ontario have a total installation of over 100,000 horse power and are here listed:

## Central Electrical Stations Distributing Power for Mining

| Company                          | H. P.  |
|----------------------------------|--------|
| Algoma Power Co. . . . .         | 1,600  |
| Algoma Steel Corp. . . . .       | 2,400  |
| International Nickel Co. . . . . | 21,300 |
| Lorne Power Co. . . . .          | 9,600  |
| Wanapitei Power Co. . . . .      | 9,966  |
| Nor. Ontario L. & P. Co. . . . . | 20,420 |
| Gowganda Power Co. . . . .       | 800    |
| South Bay Power Co. . . . .      | 250    |
| Great Northern Power Co. . . . . | 6,000  |
| Associated Gold Fields . . . . . | 1,600  |
| North. Canada Power Co. . . . .  | 19,800 |
| Lower Sturgeon Power Co. . . . . | 8,000  |

Total H. P. . . . . 101,670

The Ontario output of metals had been of some importance for many years, but pre-eminence was not reached until the opening up of the newer sections of the province by the construction of railways led to phenomenal discoveries of mineral wealth.

## 8 Plants, 40,000 H.P. for Nickel

The first of these was the discovery in 1884 of the copper-nickel deposits near Sudbury, first mined for their copper content but later attaining tremendous importance for their nickel content; during the great war the demand for both nickel and copper was greatly stimulated and the peak of production was reached during this period, the value of the nickel mined in 1918, when refined, was \$37,000,000; the value of the copper mined in 1916 passed \$12,000,000. The commercial importance of nickel is a comparatively modern development and consequently the mining and refining of this metal has only recently become intensive. At the present time there are eight hydro-electric plants with a total capacity of 40,000 horse power developed primarily for the nickel industry, and their importance can be estimated when it is realized that previous to their construction the industry, as far as Ontario was concerned, was confined to the production of copper-nickel matte, which was exported to Wales and the United States for refining.

With the armistice the need for nickel lost its artificial stimulus and production had to be curtailed until the surplus stocks of this metal were absorbed. Present indications are, however, that this process is about complete and that the mining of nickel will shortly open

up a staple industry to supply the ordinary demands of peace.

## 20,000 H.P. in Silver Region

In 1903 the next great discovery — that of silver — was made and during the early years of the Cobalt mining consisted in the winning and export to refineries of vast quantities of rich silver ores. The effect of this discovery made itself felt in 1905, when the silver output passed the million dollar mark, steadily increasing, reached a peak value of nearly \$18,000,000 in 1912. As the supply of high-grade ore declined, the practice of milling low-grade ores improved and the silver industry is now consolidated into the hands of three or four large corporations which maintain a steady output of some ten million ounces annually.

The influence of water power development in making possible this consolidation and stabilization of the silver industry, existing as it does in a country where coal is very costly, may be gauged by the fact that the first development was not installed until 1910 and that now upwards of 20,000 horse power is employed in the silver regions of Cobalt and Gowganda.

## 20,000 H. P. for Gold

The discovery of gold at Porcupine in 1909 was made by prospectors seeking new silver fields. The gold industry, however, did not lend itself to any preliminary individualistic mining such as characterized the silver finds. The first requirement for successful operation was a supply of power, and consequently no increased output of gold occurred until the Northern Canada Power Company had developed power at Sandy Falls and Wawaitin Falls on the Mattagami river — 2,400 h. p. was installed at the former site in 1911 and 6,900 h. p. at the latter in 1912. The effect of this was remarkable, and the output of Ontario gold in 1912 was 100,000 ounces greater in 1911 and has grown steadily until the annual output is approximately 1,000,000 ounces. This increase in production has been made possible by the increase of power development, which is now approximately 20,000 h. p.

## More Power Being Developed

The mining industry of Northern Ontario can now be said to have reached a point where a long and stable production of gold, silver, nickel and copper can be anticipated. The reserves of ore in sight in each case are very great, and new finds, a percentage of which should prove important, are constantly being reported.

Official records show clearly that all the power that can be required is readily available, and it is interesting to note, as indicating the faith of mining corporations in the future of the industry, that not only has a lease been secured from the Quebec authorities for an important power site on the Quinze river, presumably for gold mining purposes in the Porcupine region and the new gold district in Quebec, but also the Hollinger mining interests are reported to have secured a lease for the "Carrying Place" site on the Abitibi river where, it is stated, 20,000 horse power is shortly to be developed.



## THE FIRE RESISTIVE PROPERTIES OF GYPSUM

Gypsum has taken its place among structural materials in such products as plastering sand, wall board, plaster board, partition and flooring tile, Keene's cement, and gypsum blocks for the protection of columns. In Appendix III of the Report of Committee C-II of the American Society for Testing Materials, to be presented at the forthcoming meeting in Atlantic City on June 24-29, Mr. S. U. Ingberg discusses the fire-resisting properties of gypsum and gypsum products.

Gypsum products are made of gypsum with varying amounts of water to which may be added various fillers such as sand, cinder, wood fiber, or metal. When gypsum or any of these products are heated, the mixed water is first evaporated, after which the combined water of the gypsum is driven off. If the temperature is moderate (107 deg. Centigrade) the loss of water may stop at three-fourths of the total combined water of the gypsum, leaving the product as plaster of Paris with the impurities of the gypsum and the filler, if any. In practice, this change takes place over a wide range of temperature, being influenced by the conditions and the substances present other than gypsum.

When gypsum products are exposed to fire the temperature-rise is retarded not only by the poor heat conductivity of the material, but by the evaporation of the mixed water and by the consumption of heat in dehydrating the gypsum. But since anhydrite, the product formed by complete dehydration of gypsum, is specifically heavier than gypsum, the change caused by heat is accomplished by shrinkage and cracking. In this way the heat-insulating power is impaired. This effect is reduced by the addition of an incombustible filler.

Tests have shown that steel columns and reinforced concrete columns protected by gypsum or gypsum products stand exposure to fire for considerable periods without collapsing under pressure. For example, columns so protected with gypsum materials 2 inches thick, applied as molds re-inforced with wire, have withstood a 4-hour fire exposure "with an indicated loss of strength of not over 25 per cent as tested cold after fire exposure. When not reinforced, failure of the covering due to shrinkage effects took place before the end of the fire test."

## MICROSCOPIC EXAMINATION OF GYPSUM

The uses of gypsum are rapidly extending. The mineral is found in very large quantities in sedimentary formations of which it may be considered as one of the rocks. It is usually in such a position that it can be cheaply mined or quarried. It owes its value to the fact that it is a crystalline hydrate that can be easily dehydrated by heat; after which, on mixing with water, it crystallizes again with the water, becoming gypsum once more. The setting of plaster of Paris is simply the formation and crystallizing of gypsum from the partially dehydrated material.

To make plaster of Paris from gypsum, the raw material must be heated carefully, and not too long. Good plaster of Paris still contains about one-fourth the water of the original gypsum, and from the standpoint of the chemist it is called "hemihydrate." In this condition the substance can quickly combine with the water of which it has been deprived in the heating process. But if gypsum is completely dehydrated, it combines with water very slowly so that the product, called "artificial anhydrite," is useless for the purposes for which plaster of Paris is employed. At the same time, anhydrite is harder than gypsum, and not so easily dissolved in water. Keene's cement is mostly artificial anhydrite.

Raw gypsum contains, in addition to the principal substance, more or less quartz, anhydrite, calcite, and clay. As the quality of gypsum products is influenced by the impurities, it is desirable to have a rapid method of determining their quantities. In an appendix to the Report of Committee C-II on Gypsum, to be presented at the meeting of the American Society for Testing Materials at the meeting at Atlantic City on June 25-29, Mr. Esper S. Larsen describes a method founded on the use of the microscope, preferably of the petrographical model. When a thin slice of gypsum or some of the powdered mineral is examined as in the determination of rocks by the optical properties of the mineral constituents, it is easy to pick out the particles of quartz, anhydrite, calcite, and clay, and even to determine their quantities roughly, by counting the grains, estimating sizes, and calculating weights. It is possible in this way to determine the proportion of anhydrite in gypsum to within 0.5 per cent in samples containing less than 5 per cent and to within 1 per cent in samples containing 10 per cent. The time required is from a few minutes to one hour, depending on the care taken and the number of slides examined. Details of the method are given in the paper quoted.

## BARYTES

The principal uses for barytes after washing and grinding are as an inert pigment and filler in paint, paper, linoleum, oilcloth and rubber manufacture, and in the preparation of lithopone and a number of chemicals. The most important of such chemicals, other than lithopone, are: barium binoxide (used in preparation of hydrogen peroxide); barium chloride (used by pressed brick and by rubber manufacturers to neutralize sulphur content); barium chloride (used in battery plates, and as a mordant by dry-color manufacturers, and in tanning leather); barium nitrate (used in munitions and in making 'red fire' (used in barium sulphate precipitated, or 'blanc fixe' (used in rubber manufacture; for painting on interior steel or battleships and other sea-going vessels; also as a detector in taking X-ray pictures of the human body).

More than half the total tonnage of barytes utilized in the United States is in the manufacture of lithopone. This is a chemically-prepared, white pigment containing about 70% barium sulphate and 30% zinc sulphide, and is one of the principal constituents of "flat" wall paints now so extensively used in office buildings and hospitals, replacing both paper and calcimine wall finishes. Present quotations for barytes vary from \$5 to \$9 per ton, crude, f.o. b. rail-shipping point, depending on quality. Most barite has to be washed and acid-treated to remove iron stains or other impurities before being suitable for paint use.

The mill of the Geduld Proprietary on the Rand, which was formerly equipped with 100 stamps and 8 tube mills with a capacity of 500,000 to 600,000 tons per annum, has now a capacity of 800,000 tons per annum, due to the recent addition of 40 stamps and 5 tube mills. The ore is now to be ground more finely.

Though the cost of coal in Australia has not been reduced, two of its largest industrial works, the mines, mills and smelters dependent upon the ore of Broken Hill and the associated iron and steel works at Newcastle, have recommenced operation on a reduced scale.



# CHROMIUM\*

ITS OCCURRENCES AND USES

By HENRY BAILEY, M.I.M.M.

In common with many of the lesser-known metals, chromium in an unalloyed condition has found few uses in the Arts. In the form of alloys, however, it is being increasingly used, new applications being constantly discovered, so that possibly in the future it may rank as one of the most important alloying metals.

The most popular alloy of chromium is that produced in combination with steel to the extent of about 12 per cent., and constitutes the metal used in the production of stainless cutlery. As the knowledge of the heat treatments necessary for the manipulation of such alloys is extended, then utilisation for purposes other than cutlery is only a question of time, and an age of rustless steel inaugurated. Pure metallic chromium somewhat resembles iron in appearance, but is brighter and has a white colour; it is harder than glass, has a specific gravity of 6.92, and a melting point considerably higher than platinum; combined with a small percentage of carbon, its melting point is much lowered and its hardness increased to such an extent that it can only be cut by the diamond.

## The Raw Material

Chromium has not been found in the free or native state, the principal raw material from which it is derived being the mineral chromite or chrome iron ore, in which the chromium oxide exists in combination with iron oxide. This mineral is fairly widely distributed in nature, and doubtless supplies will keep pace with the increasing demand. Another ore of the metal is crocoisite, a chromate of lead. This, however, is not sufficiently plentiful to be a commercial source of the metal.

Many minerals derive their colour from the presence of small amounts of chromium, and this is true in the case of the emerald and ruby.

Chemically, chromium resembles iron, two series of salts being obtainable from two principal oxides, each series having a value commercially. Chromium sesquioxide is of a fine green colour, and, in addition to its being the source from which the pure metal may be obtained, is the valuable pigment known as chrome green. It is also used in the preparation of coloured glass, enamels, and porcelain, imparting to them a fine green tint.

## Chromium Trioxide

Chromium trioxide is red in colour, and being of an acid nature forms the basis of a series of salts known as chromates and bichromates, and in its hydrated form constitutes the chromic acid of commerce. The bichromates of soda and potash are very largely used in dyeing and for many purposes where a compound in which the oxygen present is easily available is required. For the preparation of the pure metal the purified sesquioxide is used, and may either be reduced by carbon in the electric furnace, the resultant metal containing some carbon being further treated until

all carbon is eliminated, or the reduction may be made by the "Thermite" process, the sesquioxide mixed with powdered aluminium being ignited, the resulting metal having a high degree of purity. For the purpose of chrome steel manufacture, pure metallic chromium is rarely required, being much too expensive for the purpose, the present price being somewhere in the neighbourhood of 5s. per lb., a more suitable and less expensive alloy known as ferro-chrome containing from 60-70 per cent. of chromium in combination with iron and produced directly from the ore chromite being used.

For the production of ferro-chrome there are two methods available, the "Thermite" method and the electric furnace reduction process, each of the two processes being used as circumstances and requirements dictate.

## The "Thermite" Process

In a great many instances the alloy maker and, more particularly, the steel alloy maker, calls for a metal with a high percentage of chromium free from carbon and with low percentages of other impurities, and to meet these conditions the "Thermite" method must be adopted, although the cost of production is necessarily higher than that of the electric furnace product.

In the "Thermite" process advantage is taken of the great affinity possessed by aluminium for oxygen, so that if a crushed oxide ore is mixed with powdered aluminium and the mixture ignited, a very intense heat is generated by the reaction, and a fused bath of metal results. Unfortunately with chromite the reaction does not take place with the simplicity one would expect from similar reactions with other oxides; not only does the mixture refuse to satisfactorily ignite, but even when once started the reduction does not proceed with sufficient vigour to maintain the mass at a sufficient temperature to give a fused metal which separates easily from the simultaneously formed slag, and it is essential to produce a satisfactory product and a high percentage recovery to incorporate with the ore mixture a percentage of an active oxidising agent; the mixture naturally increases the cost of the resultant metal, as not only has the cost of the incorporated oxidiser to be considered, but also the additional aluminium required to combine with the added oxygen.

## Some Experiments

The writer, in conjunction with Mr. George Dickie, of Luton, did a considerable amount of work on the nature and extent of the oxidiser required to get a nearly perfect reaction, and evolved a scheme of operations which gave a high-grade carbon-free ferro-chrome from an ore of somewhat poor quality. The chromite operated on contained an excess of iron oxide in admixture in addition to a considerable percentage of silica, with a result that, reduced direct with aluminium, the ferro-chrome produced was too

\* From "Raw Materials Review," London.



low in chromium and, moreover, contained an unduly high percentage of reduced silicon. A preliminary concentration of the chromite was conducted on lines similar to that in use in the mines for the recovery of tin, the roasted ore being run in the form of a thin pulp on to a "buddle," the chromite having a higher specific gravity than the associated impurities was obtained as a head, the impurities giving a tailings low in chromium. The concentrated chromite was dried, mixed with the necessary aluminium and oxidiser, and when ignited with a fuse was vigorously reduced, producing the required grade of carbon-free metal which separated easily from the fluid slag. It is of interest to note that this slag, which consisted mainly of aluminium oxide or artificial corundum, was freely interspersed with minute crystals of synthetic ruby.

For the production of ferro-chrome in the electric furnace it is advisable to conduct the operation in two stages. The first stage consists in fusing the chromite mixed with carbon as a reducing agent together with the requisite fluxes in an electric furnace to produce a metal having a fairly low melting point and a comparatively high percentage of carbon. This high carbon ferro-chrome is then transferred to an electric refining furnace, where it is fused with such fluxes as experience dictates until a metal is obtained containing such a percentage of carbon as the steel-maker demands.

Chrome steel has long been used in the manufacture of armour-piercing projectiles, and usually contains about 2 per cent. of chromium; it is also used for certain rock-crushing machinery and for safes. Alloyed with nickel and other metals a very valuable series of acid-resisting alloys have been obtained, and it only remains for a comparatively cheap process for producing chromium or ferro-chromium from its ores to be discovered to render it available for the construction of much larger units than is now practicable.

### CHROME-ORE PRODUCTION IN RHODESIA

A feature of mineral production in Rhodesia during the later months of the year 1922 has been the expansion of the chrome-ore industry. The total production of chrome ore in 1921 was 50,188 tons, and in 1922 94,475 tons. The highest production for any single month was in November, 1922, when 24,814 tons were mined.

For some years past Southern Rhodesia has been one of the principal chrome-ore producing countries in the world, and, as in the case of various other minerals, the demand occasioned by the European war resulted in a very marked increase in output. Between June, 1921, and May, 1922, the demand dropped to such an extent that practically all the mines in Rhodesia ceased producing. Since May, 1922, there has been a revival in the demand for chrome ore on a larger scale than ever.

The principal producers of chrome ore in Rhodesia are associated ventures styled the Rhodesian Chrome Mines (Ltd.) and the Rhodesian Metals Syndicate (Ltd.). These companies hold claims in other parts of Rhodesia than the Selukwe district, where the principal deposits are located, and such is the variety of their deposits that they are able to supply almost any grade, both hard and "fines." The deposits are very extensive and mining costs are comparatively low. The present price of Rhodesian chrome ore (50 per cent) is from £5 to £6 per ton. —Commerce Reports.

### INHERENT EFFECT OF ALLOYING ELEMENTS IN STEEL

The sciences of chemistry and physics have greatly contributed to the advances in the manufacture and treatment of steel. Their application has converted the steel industry from a rule-of-thumb business to one in which the properties of the product can be controlled with some degree of certainty, if not yet perfectly. By chemical analysis, uniformity of the raw materials is guarded, and by the same means the composition of the product is watched. The physicist and engineer have contributed methods of measuring high temperatures, the use of the microscope to examine polished or etched surfaces and so to examine the structure minutely and refined methods for measuring hardness, brittleness, strength and magnetic properties. But it is by exploration in a region lying between chemistry and physics, namely in physical chemistry, that the greatest amount of information has been brought to light regarding the structure and properties of steel.

At a meeting of the American Electrochemical Society (New York, May, 1923), B. D. Saklatwalla, General Superintendent of the Vanadium Corporation of America, presented a paper with the above title in which he gave a clear and informing account of what is known about the inner effect of alloying elements in steel. He also suggests a direction in which knowledge is incomplete and awaiting further research.

Steel, according to Mr. Saklatwalla, is, at the ordinary temperature, a heterogeneous conglomerate of various crystalline constituents cemented together by a medium of imperfectly known physical state. This cementing material binds the crystals together.

#### Crystal Growth

The physical properties of steel depend then largely upon the shape, size, and arrangement of these crystals and upon the quality of the cementing material. The growth of crystals, as is well known, is influenced by a number of factors, including rate of cooling and the presence of substances other than those forming the crystals. Other things being equal, the slower the cooling, the larger the crystals. Substances of a colloidal nature, such as glue or white of egg, retard the growth of crystals, and may also cause unequal growth on different surfaces, so that a substance that will form, under favorable circumstances, granular crystals may under these hampering conditions grow long or branching crystals.

Another interesting property of growing crystals is that as they form they tend to reject impurities. A familiar example of this is the well-known fact that ice forming over salt water has very little salt in it. On the other hand, if the impurity is closely related to the crystallizing substance, the latter may incorporate the former in its crystals, in some cases indefinitely, in others to a limited extent.

#### A Problem for the Researcher

Mr. Saklatwalla makes use of these and other known facts in the growth of crystals to explain the effect of alloying elements on steel. The main constituents of ordinary carbon steel are, from this standpoint, iron and iron carbide; and the properties conferred upon iron by carbon, making it steel, are to be explained by the interaction of iron and iron carbide. But the explanation is still incomplete, because, as suggested by Mr. Saklatwalla, there has so far been no thorough investigation of the properties of iron in the liquid condition at its point of solidification. The iron molecules have certain properties at that point, including those that make steel hard. These are progressively lost as the iron solidifies and cools.



If, however, the iron is cooled suddenly enough, the molecules are prevented from losing or changing these properties. The presence of iron carbide decreases the rate at which the change takes place, so that while pure iron becomes very slightly harder even when suddenly cooled, steel acquires the property of hardness under those conditions.

"The inherent physical effects of chemical elements undoubtedly start in the liquid stage, and, as the physical properties of the liquid from which crystallization takes place determine to a great extent the properties of the crystallized solid, the influence of the alloying elements should be studied in relation to the physical changes occurring prior to or during solidification. While undoubtedly, by the proper thermal treatment, much can be achieved in solid steel, yet it will be right to assert that the inherent characteristics of the steel are defined up to solidification in the ingot stage, and that all later thermal manipulations are of secondary importance." This emphasizes the importance of studying alloy steels from the point of view of the relation of their composition to the properties of the alloys at the point of crystallization, as well as throughout that process. Up to the present, research has been directed rather to the properties, composition, and minute structure of solid steel.

### The Alloying Elements

The influence of alloying elements on the crystallization of iron is twofold. The alloying element is taken into the crystals of iron up to a certain maximum, beyond which it is rejected and remains in the cementing material between the crystals. It modifies the properties of the iron crystals and also those of the cementing material between them. It not only influences the rate of growth of the iron crystals but may cause them to grow faster in one direction than in others and so to form long fibres or branching growths, conducive to strength in the steel. The slow growth has the same effect as quick cooling in preventing coarse-grained structure caused by large crystals.

The cementing material may be largely of the same composition as the crystals. It is a well-known fact that the presence of foreign elements lowers the crystallizing temperature. In the process of crystallization these materials are concentrated in the liquid part. If the cooling is rapid enough the iron along with the foreign element forming this liquid may become solid without crystallizing, thus giving a structure to the whole analogous to that of porphyry, where the fine-grained material between the crystals of feldspar, quartz, etc. may be largely of the same composition as the crystals.

The presence of an alloying element may increase or decrease the power of the growing crystal to incorporate impurities and so decrease or increase the amount of these impurities left in the cementing material. This may so affect the properties of that material as to profoundly influence the physical properties of the steel dependent on those of the cementing material (called by Saklatwalla "intercrystalline medium"), such as elastic and endurance limits.

### A Useful Theory

The author uses the rejection of the alloying element by the growing crystals to account for the non-corrosiveness of chrome-steel, pointing out that this property shows itself markedly only in steel that has at least 10 per cent of chromium. At some point below that amount, the iron crystals are capable of incorporating all the chromium, but with 10 per cent to 14 per cent enough chromium is rejected to coat the surfaces of the crystals and so protect them from corroding agents.

In a similar way he accounts for the special properties of 3.5 per cent nickel steel and 12 per cent manganese

steel, these amounts being necessary in order to saturate the iron crystals and at the same time leave enough over to improve the properties of the cementing material. On the other hand the growing crystals reject any surplus of sulphur and phosphorus and these elements so change the properties of the cementing material as to produce the well-known effects in the steel.

### Inter-molecular Cohesion and Hardness

The relation of surface tension to the molecular composition of steel is used to throw light on hardness and other properties bound up with it. The hardness of a metal is generally increased by the addition to it of another metal. A familiar example of this is the use of copper to harden gold. Hardness is in part a measure of the difficulty of separating molecules from each other. The introduction of a second metal provides for the well-known attraction of unlikes and thus increases the strength of cohesion among the molecules. A study of this subtle property, surface tension, due to molecular attraction, familiar results of which are seen in the roundness of raindrops and dew and the rise of water in very small tubes, may throw light on many obscure steel problems. "Hence we see the importance of a study of the surface tension qualities of a metal in the liquid state, and the influence of foreign elements on the surface tension, in order to arrive at engineering merits after solidification."

Future advances in the metallurgy of steel will come largely from the application of methods of research dependent on the use of the highest scientific knowledge at our command. Much has already been accomplished in this way, but much remains to be done. As producers of nickel, chromium, and molybdenum ores, Canada should take part in the necessary research.

### TANTALUM IN COMMERCE

The current issue of *Industrial and Engineering Chemistry* contains a description of the preparation, properties and uses of the metal tantalum. It is best known for its former use as the filament in incandescent electric lamps, and between 1903, when the first process for making tantalum wire, and 1911, when it was superseded by tungsten filaments, millions of lamps fitted with tantalum wire were made and used.

The most common of tantalum-bearing minerals is tantalite, the combined oxides of tantalum, iron and manganese. From this the pure oxide of tantalum is separated with comparative ease, and the oxide is reduced to the metal in a specially constructed vacuum furnace. The metal is not attacked by acids except hydrofluoric, nor by caustic alkalis. It combines readily with hydrogen, oxygen, or nitrogen, being capable of taking up 740 times its own volume of hydrogen. The pure metal resembles platinum in appearance, has a melting point of 2850° C., a specific gravity of 16.6, and is tough, ductile and malleable, its tensile strength reaching 130,000 lbs. per square inch. It oxidizes in the air at a comparatively low temperature.

Numerous chemical and industrial uses are suggested for tantalum, making use of its chemical inertness. The most obvious use seems to be as wire, sheet or ribbon in radio sending and receiving apparatus, where its capacity for absorbing gases would make it very useful in the vacuum tubes. It has also some electrical characteristics that may make it very useful.



# THE MINING DISTRICTS

BY THE JOURNAL'S CORRESPONDENTS.

## NORTHERN ONTARIO

**Dome Report.** — The annual report of the Dome Mines for the year ending March 31st, which has just been issued shows that a total of 363,000 tons of ore were milled and the recovery amounted to \$4,287,935, an average of \$11.79 a ton. This grade compares with \$1.80 for the preceding year and the gross recovery shows an increase of \$1,300,000. The profit for the year was \$2,426,856, as compared with \$1,245,000 in the preceding year. The total quick assets amount to \$2,677,821, and there is also a Dividend Assurance Fund of \$1,026,839. The issued capital now stands at \$4,290,003, and the surplus as at March 31st is \$1,126,693. Compared with the preceding year the report is an exceptionally encouraging one; but there are some features that indicate the possibility of the hanging-wall ore-bodies being cut off below the 12th level. The report indicates that the porphyry is dipping to the north at a comparatively flat angle and points to the possibility of this cutting off the sedimentary rock in which the ore-bodies are found. It is, however, too early as yet to make any definite statement regarding the possibility of ore-bodies at greater depth, and it may well be that other deeper ore-bodies will be found. To offset this one discouraging feature, the developments toward the Dome Extension have been very favorable and have opened up ore on the 12th level. In this section of the company's property, the porphyry is dipping to the south and the possibilities for substantial ore-bodies are very encouraging. The production, profits and amount of development work done were less than would have been realized had it not been for the power shortage that occurred during five months of the Dome's fiscal year. Due to the same factor, the cost per ton was greater and was \$5.25 as compared with \$4.56 in the preceding year. With the notice calling the annual meeting has been sent a copy of the by-law it is proposed to pass. This by-law provides for the transfer of the assets to a new corporation, with the capital stock divided into shares of no par value. One feature of the by-law which no one seems to understand, is the fact that out of the assets of the present company there shall be reserved from the transfer, cash and liquid securities not to exceed \$2,000,000, which shall be retained by the company and paid and distributed from time to time as the directors of the new corporation shall decide, in the same manner and proportions as dividends shall be payable to shareholders of the new corporation. This is one of the proposals that has resulted in the opposition to the present management which it is expected will develop at the annual meeting. Officials of the company state that they do not anticipate any trouble, but it is learned on good authority that a very large block of stock will be represented by the opposition.

**No Power for Vipond.** — The officials of the Vipond have notified the shareholders that the power com-

pany propose to discontinue power service to the mine commencing June 1st. This action was taken on account of the scarcity of power and prior contracts held by the large producing mines of the district. The directors first announced that they would close the property down, but on account of the very encouraging discoveries that have been made during a comparatively recent period, it was decided to operate by steam for a short time in order to gain information which would permit the directors to proceed with the equipment of the mill. The officials state that a new ore-shoot has been developed on the 400-foot level for a length of 470 feet, with an indicated average for that distance of \$18.20, over 62 inches, the vein, however, being wider than the drift. The same vein has been cut on the 300-foot level, and gives an average of \$15.55 for the length of 41 feet developed. A more important discovery has been made on the 1000-foot level, close to the Hollinger line, where a vein showing a value of \$28.00 over 4 feet was cut.

**Continued Power Shortage.** — The general manager of the Northern Canada Power Company has stated that that company will be unable to supply power to any except the three big mines of Porcupine, the Hollinger, Dome and McIntyre. He has also stated that it will be a year before power can be supplied to any other companies. Contrary to the general expectation, there will be no change when the Sturgeon Falls plant is in commission, as in view of the expected shortage later on, it is necessary to conserve the water available. There is a good deal of disappointment felt over this, and there is also a feeling that the three big mines should not be allowed to monopolise the power supply. The future of the district lies not only with these properties, but also with other new properties that may be developed. The three operating companies are financially able to stand any loss that may occur until such time as power is available from the new Quinze plant; but it is a different proposition with those companies that are not producing, and the added expense of generating steam power or closing down may prove to be a very severe handicap. Any property that gives real promise can be financed without much difficulty at present, but conditions may change within the next eighteen months and it may not be so easy to arrange for funds. The Great Northern Power Company expects to be in a position to deliver power some time this month, but its power is 60 cycle, while that of the Northern Canada is 25, so that a switch from one to the other could not readily be made. It is understood that the Hollinger, within a short time, will call for bids on its Abitibi development, where it is expected that 20,000 h.p. will be generated.

**Kirkland.** — During the month of May production from the Teck-Hughes Gold Mines amounted to \$103,000, which is the largest monthly output in the history of the company.



At the Lake Shore work is under way on the new mill, which it is hoped to have in operation by fall. The new steel head frame is being erected and will be completed this month. The old mill building is being extended and the foundations for the new crushing plant are also under way. The shaft is now down 760 feet, and will shortly reach the 800-foot level, where lateral development will be commenced.

An official report of the new discovery on the Kirkland Lake Proprietary states that a well mineralized fracture has been cut 200 feet south of the main shaft, and shows an average of \$7.50 over a width of 59 inches and for a length of 26 feet, the length that had been driven at the time the report was issued. The management state that the discovery is likely to be important.

The new mill at the Argonaut has been started at about fifty tons a day. The mill has a capacity of two hundred tons, and it will gradually be brought up to this.

A statement of the Kirkland Lake Gold Mines show that for the four months ending April 30th, there was an operating profit of \$8,423. This, however, was before allowance was made for interest and depreciation. Interest alone amounts to \$3,000 a month. Notes payable to the Beaver Mine amount to \$382,400 and accrued interest amounts to \$121,864. The report holds out encouragement regarding the new vein that has been discovered in the lamprophyre and has been proven on the 700, 800, 900 and 1000-foot levels.

**Cobalt.** — An interim report of the Beaver Mines shows that on December 31st last there was cash on hand of \$128, inventory ore, and bills receivable of \$15,000, while bills payable amounted to \$6,000. The Beaver investment in the stock of the Kirkland Lake Gold Mine amounts to \$342,185 and there is a further sum of \$491,865 owing to the Beaver from the Kirkland Lake, consisting of notes and accrued interest.

The Coniagas Company, which has taken over the Beaver on a profit sharing basis, has been overhauling the mill and shaft house and installing new equipment in the mill in order to increase the capacity. It was expected that the mill would be able to start about the middle of June, but it is now found that it cannot be started until some time in July. In the meantime underground work is being continued and a substantial tonnage of ore is being broken ahead of the mill. The Coniagas' expenditure on the Beaver up to April 30th amounted to \$51,482.

## NOVA SCOTIA

**Union Convention.** — The U. M. W. of A. is gathering its forces for a convention at New Glasgow at an early date, when they will discuss the re-opening of the agreement with the Dominion Coal Company for the purpose of trying to attain the 1921 rates. The Company has already refused to discuss this matter with them, further than to say that the agreement will not be re-opened, as all coal contracts have been based on the current wages, and delivery under a higher wage schedule would result in heavy financial loss. There is still much speculation as to the report of the commission of American officers, who visited the district. Knowing that the executive of the International openly state that they honorably stand by all agreements, there is little apprehension of an unfavorable report, without which

it is thought the miners would not attempt to force a return to the 1921 rates of wages. At the same time the forces are being mustered under the battle cry of "Now or Never" by the district executive, who are no doubt anxious to retain their hold on the miners. Your correspondent believes that faith will be kept and that the Nova Scotia miners will loyally stand by their agreement.

**Examinations in Progress.** — The annual Mining and Colliery Engineering examinations are being held in Sydney. There is the largest attendance in the history of Mining schools, the number sitting being 150. As these are all young men, it is a wholesome reflex of the ambitions of the younger generation growing up round the collieries. As every opportunity is afforded men with certificates to rise in the mining and engineering professions, the stimulus to acquire knowledge is strong, and the aims of the students are shown in the increased numbers offering for examination. Among those who looked in on the classes at the examinations was Mr. T. J. Brown, Deputy Minister of Mines. The broad smile of Mr. Brown alone will do much to cheer many of the candidates, wrestling with complex problems of which many of them know more by practice than by theory.

## BRITISH COLUMBIA

**Indian Mines.** — G. D. B. Turner, managing director of the Indian Mines Ltd., Portland Canal District, has returned to Victoria after spending some weeks on his property. Transportation problems, he says, are now his chief concern. New machinery recently installed is giving satisfaction and progress is being made in driving the two tunnels that are opening up the ore-body.

**Dome Mountain.** — The mining property of the Dome Mountain Gold Mines Ltd., twenty-three miles north of the town of Telkwa on the Grand Trunk Pacific Ry., is reported to have been bonded by the Guggenheim interests. J. D. Galloway, government mining engineer, is said to have inspected and made a favorable report on the prospect, the gold content of the ore being high. Mining equipment and camp accomodation are being provided. H. Lee is in charge of the work.

**Copper Mountain.** — L. R. Clapp, assistant general manager at Anyox for the Granby Consolidated Mining & Smelting Co. Ltd., will have supervision of the Company's prospective operations at Copper Mountain and Allenby. This mine and plant, which is being taken over from the defunct Canada Copper Co. Ltd., by the newly organized Allenby Copper Co., will be controlled from Anyox, with Mr. Clapp as resident manager, his headquarters being either at the mine or at Allenby. H. S. Munroe, general manager of the Granby Co., states that the Copper Mountain property will be producing very soon, but points out that some sixty days will be required to put the railway roadbed in condition and to make repairs at the mine and the concentrator. It is expected that between five and six hundred men will be given employment.

**New Granby Property.** — The Granby Company has acquired control of the Sultana Group of mineral claims on Boulder Creek, about 125 miles east of Prince Rupert on the Canadian National Ry. There are fourteen claims containing a large body of copper-



leadings are with values in gold and silver. Active development is promised.

**Ore Shipments from St. Eugene.** — The St. Eugene Mine, Moyie, ten years ago was the leading silver lead producer of the Consolidated Mining & Smelting Co. of Canada, and now has made its first shipment of ore for several years. Fourteen tons were contributed by the St. Eugene, to the total of 6,701 tons received at the Trail smelter during the week May 15 to 21. The detailed shipments follow:

|                                |       |
|--------------------------------|-------|
| Alameda, Alameda               | 45    |
| Company Mines                  | 6,022 |
| Henderson Gp. Smithers         | 21    |
| Knob Hill, Republic, Wn.       | 106   |
| Lone Pine, Republic, Wn.       | 162   |
| Quilp, Republic, Wn.           | 53    |
| Roschbury Surprise, New Denver | 49    |
| Silversmith, Sandom            | 188   |
| Standard, Silvertown           | 41    |
| St. Eugene, Moyie              | 14    |

6,701

**Placer Gold Reported.** — A placer gold discovery of some importance is reported on Six Mile Creek near Prince George. News of the find has created a stir in the little interior British Columbia community.

**Cariboo.** — There will be plenty of water in the Cariboo for hydraulicking work. Information received from various sections in which operations are planned, notably Cedar Creek, indicate that conditions are better than last year and that a good season is assured.

**Students Visit Mines.** — A large party of students from McGill University, Montreal, recently made a tour of the chief mines of the Kootenays. Under direction of Prof. J. W. Bell the party went over the Trail smelter, the copper mines of Rossland, and other active properties. They previously had visited the Sudbury nickel mines and the coal mines of Coleman, Alberta.

**Stampede From Dawson.** — News of the discovery of a new silver ledge at Happy Creek, 40 miles south of Dawson, recently resulted in a midnight stampede out of Dawson City.

**Fuel Board's Report.** — The interim report of the Dominion Fuel Board, of which Charles Camsell, Deputy Minister of Mines, Ottawa, is chairman, has created much interest in western Canada. The consensus of opinion is that Mr. Camsell and his confreres have grasped the essentials and made some good suggestions. In the 10-year period ending 1921, Canada's bill for imported coal exceeded \$580,000,000 and in this connection the Fuel Board urges the adoption of the several measures for national fuel economy that have been discussed during recent months.

**Alberta Coal Operators to Confer.** — Coal operators of the Province of Alberta, and others interested in the business in Western Canada, will hold a conference in Winnipeg during the month of June. They will discuss the shipment of domestic coal from Alberta to Ontario. The Governments of each of the Prairie Provinces will be represented and there will be in attendance representatives of the chief dealers of Ontario. Sir Henry Thornton, president of the C. N. R., is expected to be present.

**New Coal Association.** — All the coal mines in the

Canadian prairie country north of the Red Deer River that are producing domestic fuel have joined the Northern Alberta Coal Operators' Association. The new organization includes in its membership some twenty-five active mines and the management of each of these undertakes to deal only with the Canadian Federation of Labor. A significant clause in the charter granted Locals by the latter body is that forbidding affiliation in any form with the United Mine Workers of America. The president of the Northern Alberta Coal Operators' Association is C. W. Leonard, of the Chinook Coal Co., and the secretary C. W. Crupples, of the Great West Coal Co.

**Coal in Stanley Park.** — Coal measures are reported within the boundaries of Stanley Park, Vancouver. The result has been a spirited controversy, through the press, in the City Council meetings, and elsewhere, between those who would sacrifice the beauties of the Park to industry and those to whom the natural grandeur of unspoiled nature is nothing as compared to industrial progress. Of course it has been a "tempest in a teapot" for it is more than doubtful whether the coal in question would be found when explored to be of such quality and thickness as to warrant exploitation; but while it lasted the fight was quite exciting. The artistically inclined, however, have won out. The Stanley Park coal deposits will remain undisturbed for the time at least, and the stacks and smoke of collieries will not deface the stately Douglas firs of one of the finest natural parks of the Pacific Coast.

## SULPHUR IN PETROLEUM PRODUCTS

Some Mexican crude petroleums run as high as five per cent sulphur, but in the crudes produced in the United States the sulphur content is rarely greater than one per cent, and in the majority of crudes is below five-tenths of one per cent, according to D. B. Dow, assistant organic chemist, U. S. Bureau of Mines. This sulphur may be present as dissolved sulphur, colloidal sulphur, hydrogen sulphide, or sulphur deviations of hydrocarbons. The study of these forms of sulphur is very complex, and unfortunately little information covering the chemistry of sulphur in petroleum is available. In the distillation of crude oil, either in the refinery or laboratory, sulphur generally is present in all the distillates, as well as in the residuum. Its occurrence in natural gas is quite common and consequently it is often found in gasolines derived from natural gas. Sulphur compounds have various objectionable characteristics. Distillates from certain crudes, such as those from Lima, Ohio, and Petrolia, Canada, have extremely bad odors and can not be used until desulphurized. Mexican crudes and distillates often contain notable quantities of hydrogen sulphide. As this is a toxic gas, it has been the cause of many cases of poisoning, some of which have proved fatal. Illuminating oils containing sulphur in appreciable amounts often produce poor light and are thus unsatisfactory. The use of oils containing elementary sulphur or hydrogen sulphide is objectionable with certain metals, such as copper, because of the corrosive action of such oils on these metals. Gasoline discolored by sulphur compounds often becomes quite yellow and may have the appearance of an inferior motor fuel containing components of low gravity and high end point. This appearance, of course, detracts from the price even though the gasoline may be satisfactory in use. The presence of sulphur in petroleum is therefore, objectionable, and products free from sulphur usually are more desirable. Information regarding the detection of sulphur in natural



gas gasoline and the treatment for the removal of certain sulphur compounds is given in Serial 2462, which may be obtained from the Department of the Interior, Bureau of Mines, Washington.

### SWISS CARBIDE OUTPUT

The possible production of the seven Swiss carbide factories is close upon 120,000 tons of carbide yearly, of which, with the manufacture of manures, only about 10,000 tons are used in Switzerland itself, all the rest having to be exported. The export crisis and the import prohibitions, together with the high duties of several countries, have seriously affected the Swiss carbide factories and have led, says the "Chemical Age," to the closing down of several large factories. The export of carbide, which amounted in 1919 to 37,000 tons, with a value of 20.2 million francs, fell in 1922 to 9,200 tons only, valued at 2.2 million francs, the chief purchasers being Belgium and Holland.

### RUSSIAN ASBESTOS

The pre-war annual export of asbestos from Russia was about 11,000 tons, or two-thirds of the total output. During the war and revolution, up to about 1920, Canadian asbestos largely replaced the Russian on the European market. Since 1921, however, the export of Russian asbestos has begun to revive. In the first eleven months of 1921, says the "Russian Information and Review," 1,600 tons were exported, and in the same period during 1922, 1,800 tons were sent abroad. According to the estimates of the Urals Asbestos Trust, it should be possible to export nearly 5,000 tons annually in the near future, but taking into account the difficulties of transport, and the competition of Canada, it is scarcely likely that this figure will be reached during 1923.

### MANGANESE ORE FROM BRAZIL AND RUSSIA

Quantities of manganese ore are now being shipped by water to Birmingham, Ala., from Brazil. The United States Steel Corporation recently paid duty to the Government amounting to \$104,250, and an estimate is made that in the next three months not less than \$250,000 will be paid in duty.

Over 800,000 tons of Russian manganese ore used to be exported annually in pre-war days. During the war this was largely replaced on the European market by Indian and Brazilian ores. But these ores cannot compete in quality with the better grades of the Russian product, says "Russian Information and Review," and within the last eighteen months considerable interest has been shown in the Russian ore. In 1921 the ore exported only amounted to 3,100 tons, while in 1922 it rose to 38,700 tons. The amount of high-grade Nikopol manganese ore to be exported during 1923 has been fixed at 48,000 tons, and of the total production there may be as much as 75,000 tons available for export.

**CANADIAN MINING ENGINEER**, holding responsible position in United States, desires opening in Canada. Thoroughly familiar with all details of mine development and successful record in mine operation. Must give present employers reasonable notice. Reply; Box 583, Canadian, Mining Journal, Gardenvale, Que.

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### PURCHASE OF GOLD ORES

The attention of prospectors and others is drawn to the provision in the Mining Act of Ontario authorizing the Department of Mines to purchase parcels of gold ore taken out by prospectors and others in developing or working mining claims. Arrangements have been made by which such parcels of gold ore, whether large or small, will be accepted by the Temiskaming Testing Laboratories at Cobalt, and paid for according to the schedule provided for the purpose. The Laboratories are operated under the auspices of the Department of Mines.

This offers a first class opportunity for testing the value of ores on a large scale, and also of turning ore of good quality into money for carrying on further development work. By special arrangements, on less than carload lots, freight rates on the T. & N. O. Railway are reduced 50 per cent.

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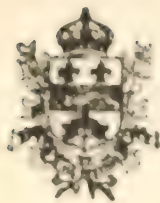
Full information as to treatment charges, schedule of payments, etc., can be obtained from the undersigned, or from A. A. Cole, Manager, Temiskaming Testing Laboratories, Cobalt, Ontario.

THOS. W. GIBSON,

Deputy Minister of Mines.

Toronto, 12th March, 1923





# PROVINCE OF QUEBEC

## MINES BRANCH

Department of Colonization, Mines and Fisheries

The chief minerals of the Province of Quebec are Asbestos, Chromite, Copper, Iron, Gold, Molybdenite, Phosphate, Mica, Graphite, Ornamental and Building Stone, Clays, etc.

### MINISTER OF COLONIZATION, MINES AND FISHERIES, QUEBEC

**MINER'S CERTIFICATES.** First of all, obtain a miner's certificate, from the Department in Quebec or from the nearest agent. The price of this certificate is \$10 and is valid until the first of January following. This certificate gives the right to prospect on public lands and on private lands, on which the mineral rights belong to the Crown.

The holder of the certificate may stake mining claims to the extent of 200 acres.

**WORKING CONDITIONS.** During the first six months following the staking of the claim, work on it must be performed to the extent of at least twenty-five days of eight hours.

**SIX MONTHS AFTER STAKING.** At the expiration of six months from the date of the staking, the prospector, to retain his claim, must take out a mining license.

**MINING LICENSE.** The mining license may cover 40 to 200 acres in unsurveyed territory. The price of this license is Fifty Cents an acre per year, and a fee of \$10.00 on issue. It is valid for one year and is renewable on the same terms, on producing an affidavit that during the year work has been performed to the extent of at least twenty-five days' labour on each fifty acres.

**MINING CONCESSION.** Notwithstanding the above, a mining concession may be acquired at any time at the rate of \$5 an acre for SUPERIOR METALS, and \$3 an acre for INFERIOR MINERALS.

The attention of prospectors is especially called to the territory in the North-Western part of the Province of Quebec north of the height of land, where important mineralized belts are known to exist.

**PROVINCIAL LABORATORY.** Special arrangements have been made with POLYTECHNIC SCHOOL of LAVAL UNIVERSITY, 228 ST. DENIS STREET, Montreal, for the determination, assays and analysis of minerals at very reduced rates for the benefit of miners and prospectors in the Province of Quebec. The well equipped laboratories of this institution and its trained chemists ensure results of undoubted integrity and reliability.

The bureau of Mines at Quebec will give all the information desired in connection with the mines and mineral resources of the Province, on application addressed to

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## Aggregate Value of \$734,259,619

The substantial progress of the Mining Industry of this Province is strikingly exhibited in the following figures, which show the value of production for successive five-year periods: For all years to 1895, inclusive \$94,547,241; for five years, 1896-1900, \$57,605,967; for five years, 1901-1905, \$96,509,968; for five years, 1906-1910, \$125,534,474; for five years, 1911-1915, \$142,072,603; for 5 years 1915-1920, \$189,922,725; 1921, \$28,066,641; for the year 1922, \$35,158,843.

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#### Equipment No. 324

1 Canadian Ingersoll-Rand Steam Driven Air Compressor, Their Serial No. 5495, Type RS2 Stage, Cylinders 16 x 9 x 16, Capacity 350 Cubic Ft. Also suitable for Belt Drive with 54 x 12 Vertical Air Receiver.

#### Equipment No. 1168

1 Canadian Ingersoll-Rand Compressor, 16 in. Steam 10 in. H.P. Air, 16 in. L. P. Air x 18 in. Stroke, Class C2, Steam Driven, Serial No. 4980, Capacity 585 Cubic Ft.

#### Equipment No. 895

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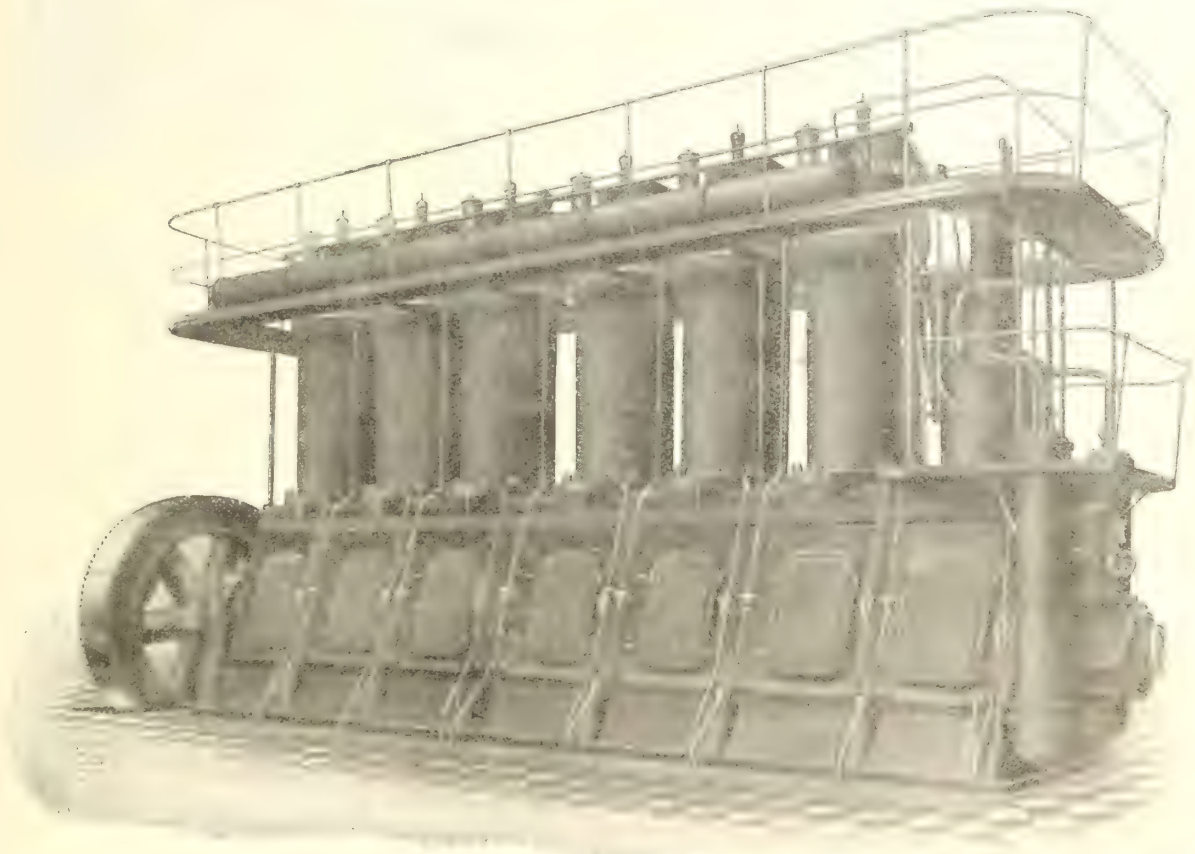
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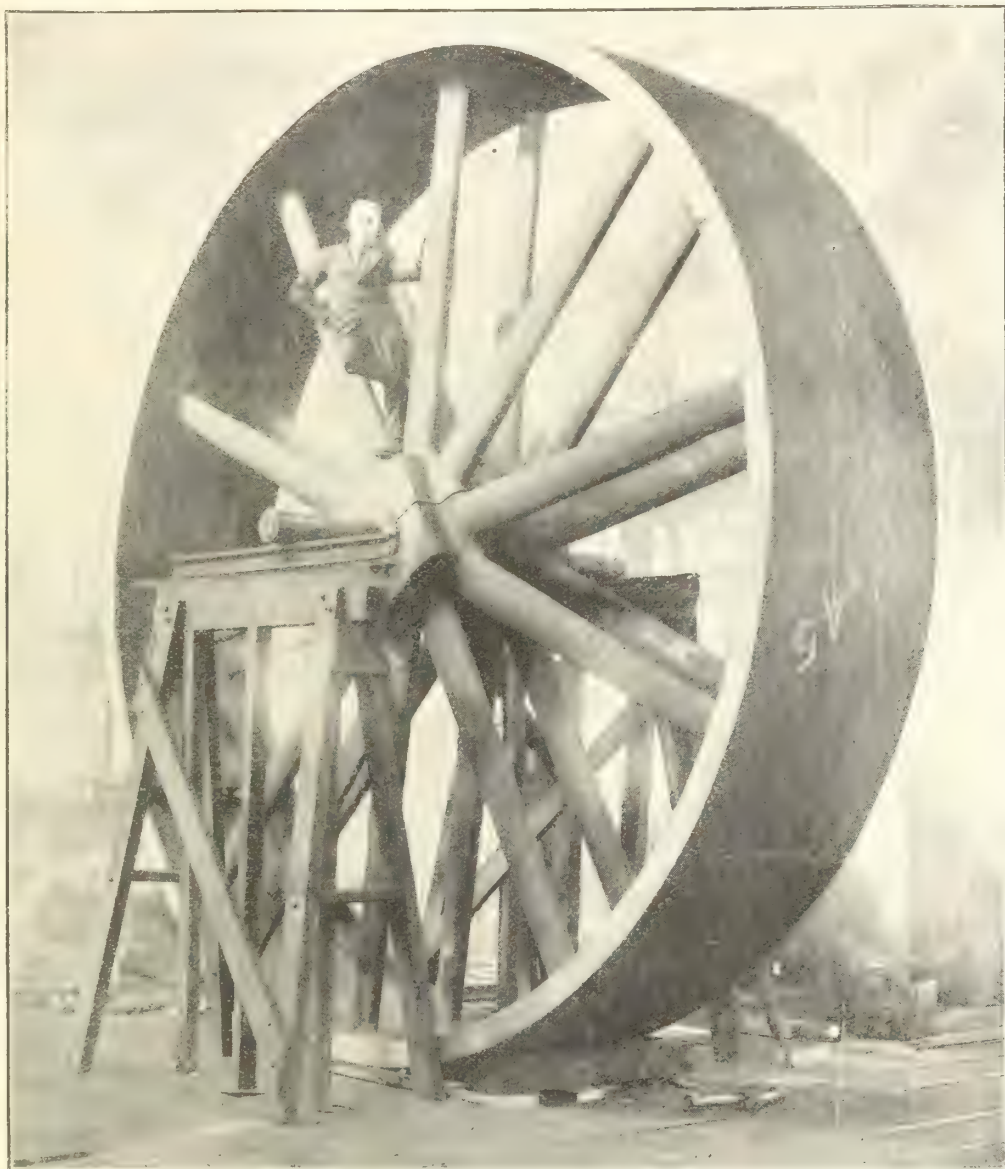
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# Minerals

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DEPARTMENT OF MINES

Hon. H. MILLS, Minister of Mines

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## Economic Minerals.

In addition to the above, practically all economic minerals (coal and tin excepted) are found in Ontario:—actinolite, apatite, arsenic, asbestos, cobalt, corundum, feldspar, fluor-spar, graphite, gypsum, iron pyrites, lead, mica, molybdenite, natural gas, palladium, petroleum, platinum, quartz, salt, talc and zinc. This Province has the largest deposits on the continent of talc, feldspar, mica and graphite.

Building materials, such as ornamental marble, limestone, sandstone, granite, trap, sand and gravel, lime, Portland cement, brick and tile, meet every demand.

## Mineral Production.

Preliminary returns show the output of the mines and metallurgical works of the Province for the year 1921 to be worth \$48,128,387, of which the metallic production was \$27,574,202.

The following figures show the rapid growth of Ontario's mineral industry by five-year periods since 1891:

| Year.         | Value.      | Year.         | Value.       |
|---------------|-------------|---------------|--------------|
| 1891 .. . . . | \$4,705,672 | 1906 .. . . . | \$22,388,383 |
| 1896 .. . . . | 5,235,003   | 1911 .. . . . | 41,976,797   |
| 1901 .. . . . | 11,831,086  | 1916 .. . . . | 65,303,822   |

## Dividends.

Dividends and bonuses paid to the end of 1921 amounted to \$23,140,734 for gold mining companies, and \$84,388,185 for silver mining companies or a total of \$107,528,919.

## Mining Regulations.

A miner's license costs \$5.00 per annum, and entitles the holder to stake out in any or every mining division three claims of 40 acres each. After performing 200 days' assessment work on a claim, patent may be obtained from the Crown on payment of \$2.50 or \$3.00 per acre, depending on location in unsurveyed or surveyed territory.

## Assay Office.

The Provincial Assay Office at No. 5 Queen's Park, Toronto, is maintained by the Department of Mines for the free identification of minerals, free assays under the provisions of the Mining Act of Ontario, and also for general assay work as per the Schedule of Charges which may be obtained on application.

## Temiskaming Testing Laboratories

The Department maintains, at Cobalt, an ore sampling and testing laboratory which is now prepared to receive parcels of gold ore from 100 pounds upward, and after sampling and assaying the same to pay to the shipper the value thereof, less treatment charges. The purpose is to afford a market for ores extracted by prospectors and others in developing their mining claims, enabling them to obtain funds which they can use for further work and to report on the most satisfactory method of treatment. Fuller information may be obtained on application to the Manager, Temiskaming Testing Laboratories, Cobalt, Ontario.

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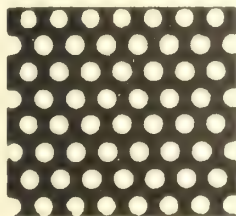
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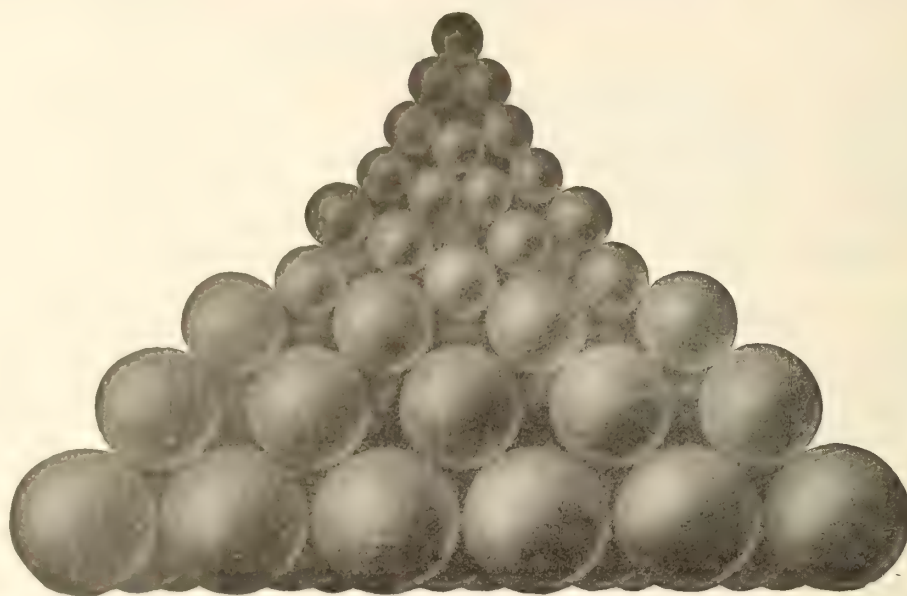
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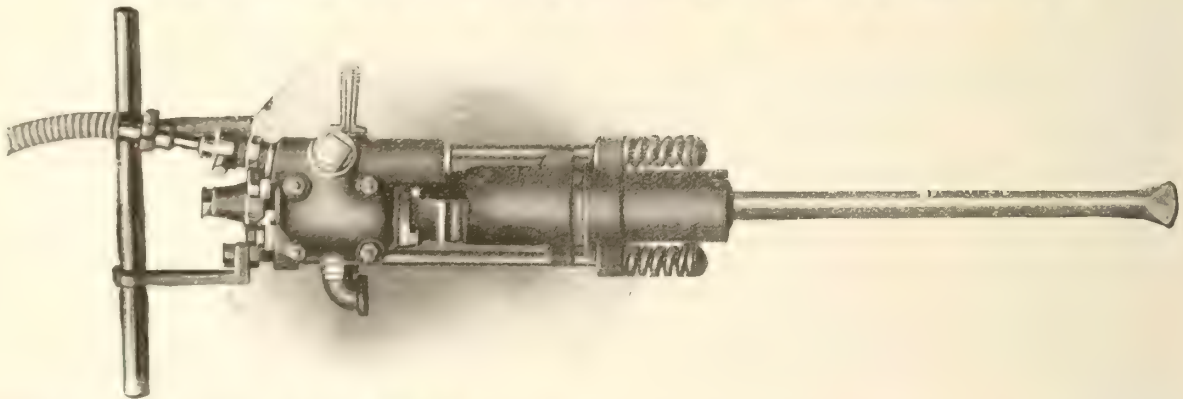
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# :-: EDITORIAL :-:

## "STIRRING UP WILLY"

In the words of the gentleman of sable pigmentation, most of the scientific research that is being done in Canada "ain't."

That expresses it. We have had an ocean of talk—and the merest spoonful of performance. Notwithstanding the fact that enlightened Canadians recognize the profound and instant need of scientific and industrial research, nothing they have done or said seems sufficient to stir our Government to action. We are reminded of the Victorian "limerick" the concluding lines of which are:—

"Now, although the room grew chilly,

"No one cared to stir up Willy."

Of the small group of men of light and leading in public life who have consistently espoused the cause of research, Mr. Hume Cronyn, ex-M.P., is the most impressive. During last winter's conference, a meeting arranged by the Canadian Manufacturers Association, Mr. Cronyn showed that Canada's organized efforts to keep abreast of the times in scientific and industrial research are almost *nil* as compared with the United States, Great Britain, France, Sweden, and Japan. Japan has been a modern nation for less than half a century. Canada was settled by Europeans four centuries ago.

What, then, is wrong? Or, as Mr. Cronyn pertinently asks: — "Are these other nations, who are making "large expenditures on scientific research, chasing a "will-o'-the-wisp? Can this idea be a mere fad or "dream?... We are the only British Dominion which "has not actively taken steps towards the establish- "ment of a national research institute. Are all the "others out of step? Is Canada alone marching for- "ward?"

The Research Council, a notable aggregation of selected brains, has been of use. Its prime function, however, is to act in an advisory capacity to the Dominion Government. If the Dominion Government refuses to be advised, there is thought to be no recourse. But recourse there is. That recourse is an appeal to the source of all authority, the people. The means of appeal is publicity.

Occasional subsidized newspaper publicity has but an evanescent effect. If, instead of focussing attention on isolated (though interesting and profitable) researches, the Research Council were to concentrate every whit of its energy on convincing the public that the future of Canada depends upon research, that in-

dustrial progress is unthinkable without it, that some one must "stir up Willy", then the goal would be practically won. The gospel of research should be, must be, preached from our pulpits, taught in our schools, in our colleges, and fed in words of one syllable to the daily press. The "average citizen", the "man on the street", and the carrier of the dinner-pail must be taught that their welfare and the welfare of their children is bound up in the nation's support of research. Public consciousness, once awakened, will lead inevitably to action at Ottawa.

The stated scientific research does not appeal to the public imagination. Results do. There are numberless convincing results, modern instances, that may be quoted. Of these there are plenty that will strike keenly the ordinary citizen. Academic generalities will not serve the purpose. The public demands the sincere and unwatered milk of the word.

We can easily visualize the speedy erection of National Institutes, Bureaux of Standards, and the accomplishment of all and more than all that the Research Council dreams of, if the public be taken into its confidence. And this is to be desired, if only to dissipate the repellant atmosphere of academic aloofness that surrounds all such bodies.

## A COSTLY HABIT

Habit is a creature of fearful and wonderful power, controlling much even of modern engineering practice. Often investigation or scientific research is required to disclose the subtle rule of habit and the resultant waste of effort and material. In other cases habit reigns supreme, without let or hindrance, in the face of the whole community. One such habit is costing the taxpayers of Canada millions of dollars annually. We are paying "through the nose" for good roads, which are not good roads; they have shoddy surfaces.

It is a curious fact that, amidst all the discussion about the hundred and one features of a good road, one point, and that the most important of them all, has received scant attention. We refer to the chief ingredient of the wearing surface of any road — the stone that composes it, in whole or in major part. Upon the wearing quality of this stone depends the wearing quality of the road; yet how often is the quality of the stone considered seriously? So far as we have observed, the larger part of our "good" roads are surfaced with crushed limestone, used either as water-bound macadam, with bituminous binder or as



the aggregate is necessary. Only when it is the road side material is a rock of better quality used, and that is very seldom. Throughout the larger part of eastern Canada, limestone of various degrees of softness is the rock most readily obtained, so of limestone our roads suffer most.

What is the result of building a limestone wearing surface? In all cases it is wasteful. We have observed a new provincial highway whose macadam surface was destroyed by a moderate stream of traffic after six weeks of use. In this instance trap rock, brought to fill at an enormous expense that would add only a few per cent. to the total cost of the road, or even of the wearing surface alone, would have made a road capable of six years of wear. The cost of hauling, spreading and rolling the rock is the same in both cases, so why not build a surface that will last six years instead of six weeks?

Some of our asphalt and concrete roads are now old enough to demonstrate similarly the value of a hard aggregate. These "permanent" surfaces have in some cases been worn down for inches through their main constituent, limestone, where the use of trap rock, at only a slight advance in cost, would have made the investment genuinely permanent. The waste due to shoddy material in this case is not so apparent; still it presents an opportunity for a reform that would save the country a tidy sum each year.

Canadian engineers have not yet tackled this problem with the vigour that is one of their natural characteristics. It is principally a problem for the civil engineer; but the miner is involved as 'the one who can best supply the proper rock. Fortunately, good trap rock or its equivalent is fairly well distributed throughout the east and west of Canada; the prairies have a road problem all their own. It is not good enough for the engineer to say that the financial authority who controls his expenditure will not give him the additional fifty cents or dollar per yard required for good rock; he must insist upon good material here as he would if he were building a bridge.

The present shoddy road surfaces are a reflection on the judgment and ability of Canadian engineers. It is up to them to institute a reform.

### CANADA'S RAILWAY PROGRESS

One of the outstanding features in Canada's development and one that has much to do with the progress of other lines of industry is that of the railways. The growth of railways has been almost phenomenal, especially during certain periods, and while, due to known causes, eras of depression have been encountered, on the whole the operation of Canada's railway lines has been remarkable.

The expansion of settlement, the rapid progress of agriculture, the development of mineral and forest industries, says the Natural Resources Intelligence Ser-

vice of the Department of the Interior, have called for the construction of many miles of railway, both of trunk and branch lines, and announcement is made by both the Canadian National, Canadian Pacific and the Ontario systems that several additional branch lines and extensions are under construction or in contemplation for the present season.

Commencing with 1871, the first census period following Confederation, when Canada had but 2,695 miles of railway, with an invested capital of \$257,035,188, Canadian railways made steady progress until 1911. At that time 25,400 miles were in operation, with a capital investment of \$1,528,689,201. In the five-year period between 1911 and 1916, however, railway expansion was almost phenomenal, 1916 showing 37,434 miles in operation, an increase of 12,034 miles in the five years, and capital of \$1,893,125,774. This heavy programme of railway construction was deemed necessary to meet the needs of the country, and so it has developed. Slower progress is reported since 1916 as during the war period practically no building took place. The year 1921, however, shows railway mileage in Canada as 39,841, with capital investment of \$2,164,687,636. The total earnings of the railways in 1916 were \$261,888,654, and expenses \$180,542,259, while for 1921 the earnings were \$458,008,891, and expenses \$422,581,205.

Nothing probably could give a better indication of Canada's industrial growth than railway traffic, both passenger and freight. In 1901 steam railways carried 18,385,722 passengers, in 1911 they carried 37,097,718 passengers, while in 1920 the number carried was 51,318,422. Freight traffic shows even a greater growth, 36,999,371 tons being moved in 1901, 78,884,282 tons in 1911, and 127,429,154 tons in 1920.

The part that the development of natural resources is taking in providing freight traffic to the railways is evident in the fact that in 1901 the tonnage of forest products was 5,301,519, in 1911 it was 13,238,347, and in 1920 22,278,880 tons was handled. Grain provided 4,694,853 tons of freight in 1901, 7,545,516 tons in 1911, and 14,295,458 tons in 1920. Products of mines in 1911 supplied the railways with 28,652,236 tons of freight and in 1920 with 45,075,968 tons. Manufactures, into which natural resources enter almost universally provided 13,573,347 tons of freight in 1911 and 32,925,394 tons in 1920, among the latter being wood pulp and paper with 3,447,614 tons.

To handle this traffic the railways used 2,433 locomotives in 1901 and 6,030 in 1920; 1,159 first-class passenger cars in 1901, and 2,212 in 1920; 45,904 box and cattle cars in 1901 and 167,128 in 1920; 23,123 coal and flat cars in 1901 and 45,188 in 1920.

The expansion of agriculture, the development of forest, mineral and fisheries resources, with their concomitant manufacturing activity portend for the Canadian railways a period of increasing freight traffic and the resultant expansion necessary to keep pace with the demands for the moving of this rapidly growing tonnage.

## MINER AND CHEMICAL MANUFACTURER

The publication recently by the Dominion Bureau of statistics of its summary report on "Chemical and Allied Products in Canada, 1921" directs attention to the close alliance between the chemical and mining industries. Their community of interest is well illustrated in the following instances, among numerous others.

Our principal mineral product is coal, which provides at present in other countries, and eventually will provide in Canada, one of the principal raw materials for the chemist's use. The manufacture of coal tar products has been barely commenced in this country, and its possibilities are vast. The proposed establishment of plants to make coke for domestic use may mark the occasion of a serious attempt to build up a coal-tar industry. We have the coal, the chemists and the opportunity, but still lack the capital and the business enterprise required.

The fertilizer industry is not growing with the rapidity it should. Unfortunately, we have no adequate deposits of phosphate at present discovered; but nitrates are available in abundance from our coal provided we adopt the means necessary to save it. Here, again, the use of coke as domestic fuel will solve the problem. Potash we have likewise in abundance, but locked away securely in our deposits of feldspar, with no key at present to open them for use. The provision of soluble potash from feldspar is a favourite field for research, and at any time a commercial process may become available.

Our paint industry is in the hands of capable and energetic leaders, and even through the period of depression it declined but little. A large part of the paint industry is dependent directly upon minerals products, viz: iron oxides, lead and zinc, with titanium oxide as a possible important addition to the list. The miner and the paint manufacturer have, most distinctly, a common interest.

Only artificial abrasives are listed for 1921. Since 1921 the mining of garnet has commenced, near Bancroft, Ontario. It is used to make red sandpaper and for other special uses and provides a restricted but remunerative market. The manufacture in the electric furnace of artificial abrasives has virtually superseded the mining of the corresponding natural varieties, so that we must look to our cheap hydro-electric power to expand this important industry in Canada.

The miner and the industrial chemist have decidedly a common interest. The miner furnishes a large and growing part of the raw materials the chemist uses in his factories. It will pay both of them to establish a closer *liaison* than that existing at present, that the chemist may know more about the raw materials available, to adapt his processes to their use, and that the miner and prospector may prosecute their search for valuable minerals with a better knowledge of what is required.

The sudden and unexpected strike of coal miners at Sydney Mines last week was settled as quickly when the British Empire Steel Corporation re-instated the nine men at Florence colliery whose dismissal caused the strike. The company's action may be interpreted by the miners as a sign of weakness, but we prefer to consider it an evidence of the spirit of toleration, which is much more characteristic of the company's attitude than it is of the Bolshevik-led miners. The fact that the miners' executive called out the maintenance men, in violation of the rules of their central organization as well as of the dictates of justice and common sense, demonstrates once more the extremely dangerous frame of mind their "red" leaders have engendered. The present event seems to be a direct and deliberate defiance of the general headquarters of the United Mineworkers of America, whose delegates recently have been investigating District Number 26.

## RESEARCH

### A Symposial Trilogy

#### Vox Populi:—

Say, these here bugs and microbes that  
Them college fellers hunts,—  
I sez it now, and always, — flat —  
I've no use for them stunts!  
I'd sooner die the good old way,  
The way our fathers done,  
Than put up any of my pay  
To give the doctors fun.  
And this here talk about research  
It sure gives me a pain:  
Them guys should get right off the perch.  
I says, once and again,  
It's me, and workers like me, what  
Produces all the wealth;  
We pay for all them fellers' got,—  
And all We have is health.

#### Bourgeoisie:—

Research is an excellent thing, I admire it;  
But I'm not at all sure that conditions require it.  
I hardly see where just exactly to fit it,  
Although it is needed,—I frankly admit it.

#### Intelligentia:—

A sheer and frank commercialism marks  
The spirit of the times. No heav'n-born sparks  
Are sighted in the firmament of thought,  
No message from the Outer Marches caught.  
And Science, heretofore a lambent flame  
Of pure abstraction, is no more an aim.  
But is applied to so-called things and men  
To utilizing dogfish, or a bean.  
The love of learning, but for learning's sake,  
Is dead within us. How then shall we make  
Our souls' communion with the earthly race  
When all the world has turned poundstake?



# Ontario's Triumvirate of Great Mining Areas

A REMARKABLE TRIANGLE

By WILFRED G. MILLER

The diagram shows the relative positions of the three great mining areas, Sudbury, Cobalt and Porcupine together with those of the other known ore centres in north-eastern Ontario. What may be called, if an astronomical term is permissible, the satellites, or should we say silver planets of Porcupine in the region, as they contain gold deposits, are Kirkland Lake, Larder Lake, Night Hawk Lake, Matachewan and West Shiningtree areas, respectively. The satellites of Cobalt are the silver producers, Gowganda and South Lorrain, together with others of minor importance in the surrounding region. While no other locality in north-eastern Ontario is of much importance compared with Sudbury as a producer of nickel-copper ores, these metals in association have been mined in small quantity in one other area and are known to occur elsewhere.

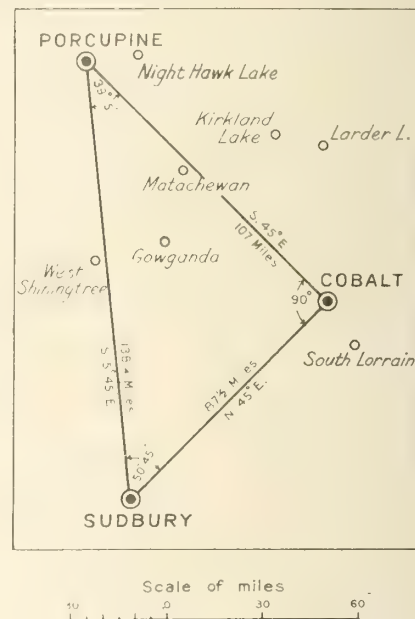
It will be noted from the diagram that the gold areas occupy the northern part of the region shown, the silver the more central and southeastern, and the nickel-copper the southern. While this broad grouping may be made, it should be added that it does not fully represent the distribution. Silver, for instance, has been found in minor quantities, and under conditions characteristic of its occurrence in the region, about 15 miles south-west of Porcupine, approximately on the side of the triangle that forms the line joining Cobalt with Porcupine. Also gold ores have been mined at no great distance to the northeast of Sudbury and also to the westward, and nickel-copper ores have been worked about 20 miles to the northeast of Porcupine. But the diagram shows the distribution of the more important known mineraliferous areas.

Leaving out of consideration post-Paleozoic erosion, the region has been subjected to at least what may be called two great periods of denudation since the gold deposits were formed and to one since the nickel-copper of Sudbury and the silver-cobalt deposits came into being. Vast thicknesses of rock have been removed from the surface and doubtless innumerable ore deposits have been destroyed. For instance, the Temiskaming series of sediments, in or near which so many important gold deposits are found, as indicated by its remnants, once occurred in great volume, but is now represented only by comparatively narrow belts and outliers of rock here and there throughout the region for a distance, north and south, of over 100 miles, and east and west, with its eastward extension into Quebec, of at least 150 miles.

That the Nipissing diabase, with which the silver-cobalt ores are genetically connected, occurred in much larger volume is evident from the fact that it is now represented here and there throughout the region by outcrops of considerable extent and by smaller outliers. Hence the present distribution, especially of the important gold and the silver-cobalt deposits, represents only what has been left after great erosion.

For some years the writer has been accustomed to speak of the "triangular" relations of Sudbury, Cobalt and Porcupine. Recently Mr. P. A. Jackson, of the

topographical staff of the Ontario Department of Mines, kindly undertook the determination of the character of the triangle, the length of its sides and the direction in which they lie, together with the size of its angles. The nature of the triangle has been determined with as great precision as is possible from existing maps, with a result that can be said to be very interesting even if it cannot be used to elucidate a scientific theory nor adapted to solve economic problems. It will be noted that the triangle possesses a right angle and that one side has a due S. W.-N. E. strike, while that of another is N. W.-S. E. Who would have thought that the architecture of any part of the earth's crust was on such exact geographical lines?



It may be added that there is no genetic relation between the gold deposits of Porcupine and the silver of Cobalt, the former belonging to an earlier period than the latter. In the case of the ores of Cobalt and Sudbury there is, however, a distinct relationship. The nickel-copper ores of Sudbury are genetically connected with norite, while those of Cobalt are connected with the Nipissing diabase. The norite and the diabase are believed to be of the same age, and in chemical composition they are practically identical. They differ only in the form in which they have crystallized.

The region as a whole, as has been shown by the writer elsewhere, presents as interesting features in the way of faults of great length and lines of weakness as are to be found anywhere. The faults are indicated by the longer diameters of lakes, the courses of rivers and other structures, some of which have been determined in mining operations. One great system has a general N. W.-S. E. strike and the other N. E.-S. W. The latter appears to be connected with the occurrence of certain ores in the region, and has been made use of in prospecting, discoveries of cobalt ores for instance having been made by testing a continuation of an in-

licated fault 15 miles or more to the S. W. of the nearest known occurrence.

The subjects of erosion, faults and the genetic relations of the Sudbury norite and Nipissing diabase, briefly described in preceding paragraphs, have been dealt with in the writer's report (4th edition) on the Cobalt area, Ontario Department of Mines, Vol. 19, part 2, 1913, as well as in earlier editions.

### ACTIVITIES AT ANKERITE

The North America Gold Corporation has commenced active work at the Ankerite Mines, Porcupine. During the last few weeks, the power plant has been overhauled and increased in capacity and unwatering of the several shafts and underground workings is now complete. Shafts Nos. 2 and 4 and the drifts from them are now dry. The more extensive workings at the 200-foot level of the central shaft were reached by the pumps last week, and the water was pumped out of the drifts at the 350-foot level during the present week. Mr. Clifford Smith, president of the Corporation, and Mr. Norman C. Stines, consulting engineer, are both on the ground preparing a plan for the full development and operation of the property.

The Ankerite property was staked in 1910, but no work of importance was done on it until Mr. Smith took it over after an examination made late in the season of 1915. Work of exploration and development was begun in the spring of 1916 and was carried on actively under Mr. Smith's direction until 1918 when operations were suspended until now. With the exception of the Dome Mines development, this was the first serious exploration work done in the great shear-zone of Porcupine that extends south-westward from the Dome, across the south-east part of Tisdale and north-west of Deloro townships.

The demonstration of the occurrence of important ore-bodies at the Ankerite aroused much local interest, and considerable curiosity and speculation resulted from a sudden suspension of operations in 1918. No authoritative reasons for cessation of the work were given out, but it is now generally understood that differences of policy arose between the parties interested at that time and that the suspension of operations had no relation to the merit of the property.

The North America Gold Corporation acquired titles to the property in August, 1922, but operations were delayed further until this company succeeded, in January last, in cancelling certain underwriting contracts that it claimed had been violated by unauthorized advertisements of stock last October. These advertisements were immediately suppressed at the time by officials of the Corporation, on the grounds that they were issued without authority and in distinct violation of contract by optionees of a certain block of stock, which was a part of the treasury stock set aside for the Ankerite financing. After cancellation of these underwriting contracts was formally completed, the Corporation entered into a new agreement with substantial private capital and the proposed development and operation of the Ankerite is now fully financed. The enterprise is a private one and no stock will be offered to the public. It is understood that the interests that have now come into the North America Corporation are among the most prominent in the mining world. Quiet investments like this by strong min-

ing capital are coming into the Northern Ontario gold-fields now to an extent that is not appreciated yet by the general public.

The Porcupine Paymaster property, which has produced such spectacular ore in development during the last few months, adjoins and carries extensions of several of the veins in the Ankerite vein-system No. 2, and the United Mineral Lands Co., owned by the Boston interests in control of the Paymaster, are now developing extensions of the Ankerite vein-system No. 1 eastward. Development of this section of the Porcupine field by adequate capital will be watched now with renewed interest.

### A NEW MAP FOR PROSPECTORS

The Geological Survey, Ottawa, has now ready for distribution three new maps. Publication 1965, a map to accompany a memoir by W. A. Johnston, shows the geology of the Fraser Delta (Vancouver and vicinity) on a scale of a mile to the inch. Publication 1978, a map on a scale of 250 feet to the inch, shows the Flinflon ore-body, and will accompany F. J. Alcock's report in Summary Report, Part E, 1922.

Map 155A, should be in the possession of all those interested in the mineral industry of Northern Ontario. It shows, on a scale of 8 miles to the inch, the geology, so far as known, from the north shore of Lake Huron to the Transcontinental Railway, and from the eastern side of the new Duparquet and Opasatika map-sheets in Quebec to the western part of the Michipicoten district. All available sources of official information have been used in the compilation of this map, and the geology has been compiled and correlated by the Director of the Survey, Dr. W. H. Collins.

Though the larger part of this area of over 50,000 square miles is still shown white on the map, indicating that it has not yet been surveyed geologically, still the principal geological features are either determined or indicated. Thus the areas of Keewatin rocks, which are of prime interest to prospectors, are either mapped entire or are indicated where they cross travel routes that have been surveyed. Large areas of granite rock, within which the chances of finding ore-deposits of economic importance are very slim, are delineated, and the labours of the geologist in tramping across these barren rocks will serve as a warning to prospectors to keep away.

There is no doubt that some of the correlation involved in the geological legend of this map will be a fruitful source of discussion among students of geology; but meantime it will prove a most useful guide to those whose impulse sends them exploring, either in person or by proxy.

### VALUE OF PANNING

Panning is the prospector's method in searching for placer gold; it is an art requiring practice. Although the particles of gold are hammered so thin in their passage downwards that it may take one or two thousand of them to make the value of one cent, each of these "colors" may be easily visible. So a good long "tail," making a brilliant show, might be worth only one twentieth or one fiftieth of a cent. But when the prospector gets skill in estimating the value of the tail, panning becomes his best helper in hunting for gold in veins and placers.



# MINING IN THE KOOTENAYS

Mining and Smelting Operations Already well Established. Wide Scope for Further Development

By A. G. LANGLEY

One of the features of "British Columbia Day" at the Northwest Mining Convention was an address by A. G. Langley, resident Mining Engineer with headquarters at Revelstoke, on the mineral resources and the future mining prospects of the eastern section of the Province. He gave a description of present conditions, sketched the geology, and made interesting reference to the mining history of one of the most productive mineral regions of the Canadian West, as follows:

The district commonly known as the Kootenays comprises some 35,000 square miles of mountain territory to the north of the international boundary line, which separates it from the States of Idaho, Montana and Washington.

To the east it extends to the divide of the Rocky Mountains, which forms the boundary between British Columbia and Alberta. On the north it reaches to the end of the Selkirk range, round which the Columbia makes a big bend and pursues its course in a southerly direction. On the west it is bounded by the divide of the Gold range, which rises from the westerly shores of the Arrow Lakes.

## Production

The Kootenay country has the distinction of being the oldest lode mining district in British Columbia, and it is not very old at that, for the first discoveries, with few exceptions, of silver-lead ores only date back to the early "nineties." Ever since these discoveries were made in the Slokan and elsewhere, the district has been responsible for the bulk of the Canadian production of lead and zinc. Today it occupies a more important position among the world producers of these metals than ever before in its history.

Last year the silver production was estimated at 2,165,266 ounces, the lead at 67 1-2 million pounds, and the zinc at slightly over 57 million pounds. As far as I can gather, the greatest prospecting activity took place before the days of the Klondike boom, which was responsible for the exodus of a lot of our best miners and prospectors. If it had not been for this, it is probable that the country would have been more thoroughly prospected and a greater number of properties opened up and brought to the producing stage. However, there have been a number of very important discoveries since these early days, among which might be mentioned, the "Standard" in 1911, and the "Florence" about 1914. The fact that promising new finds are continually being made goes to show that the district has great potentialities and is in reality still in its infancy as a mineral producer.

## Recorders and Resident Mining Engineer

The district is separated into twelve mining divisions, namely; Revelstoke, Trout Lake, Lardeau, Ainsworth, Slokan, Slokan City, Arrow Lakes, Nelson, and Trail Creek in the West Kootenay, and Golden, Windermere, and Fort Steele in the East Kootenay. In each of these divisions there is a mining recorder, at whose office much information may be obtained relative to the location and ownership of properties. The office of the Resident Mining Engineer is at Revelstoke. Here various reports, geological maps and other data are available to those who wish information regarding the district and the various mining properties. Advice is freely given, when possible, as to the best methods of development of prospects, to those who are not familiar with conditions in this part of

the country, and everything is done to help, in any way possible, legitimate mining enterprises.

## Transportation

Although a rugged, mountainous country, the greater part of it can be travelled without much difficulty or hardship as it is well opened up with excellent trails, while the C. P. R. lake and rail service provides good transportation facilities to the smelter from the most accessible and active parts of the district. In some of the outlying areas where little mining activity is going on, the problem of transportation is, and has been, a severe handicap; but this is being rapidly overcome by motor haulage, and wherever ore in quantity has been developed the Government is always willing to grant substantial assistance towards defraying the expense of road construction, under a special Act named the "Mines Development Act."

## Smelting Facilities

The immense and up-to-date smelting plant of the Consolidated Mining and Smelting Company at Trail accepts for treatment the ores of copper, gold and silver-lead-zinc. It was only last year that this plant was equipped with a customs zinc plant. This alone has been a great help to the miners of silver-lead-zinc ores, for previously great difficulty was experienced in getting rid of their zinc ore and concentrates, which often carry high values in silver.

## General Geology

A summing-up of the general geology will probably help those who are not familiar with the district to grasp the main features. On the east, the Rocky Mountains, forming a great barrier between British Columbia and the prairies, were uplifted during the close of the Cretaceous period. They owe their origin to an immense thrust from the direction of the Pacific; igneous activity has not been responsible for their upheaval. They are composed of beds of limestone, sandstone, shale and quartzite. A section along the line of the Canadian Pacific Railway from Golden to the prairies presents nearly every geological period. No important ore-bodies have as yet been developed in these mountains, with the exception of the "Monarch," at Field, which has produced a considerable tonnage of lead zinc ore. However, the Cretaceous measures in the Crow's Nest area include immense quantities of coal. A good deal of prospecting has been done for oil in the Flathead Valley, which area was reported on by the late J. D. MacKenzie of the Geological Survey.

There appears to be rather more evidence of mineralization in the southerly portion of these mountains near Fort Steele, where prospecting has been carried on for a number of years, while Wild Horse Creek has yielded a large amount of placer gold.

Coming westward from the Rockies and crossing the Columbia river, we enter the Purcell and Selkirk ranges, which occupy the central part of the district and in which the great majority of our Kootenay mines are located. These mountains were formed during the Jurassic period by an immense intrusion of granite, which has folded and contorted the overlying sediments. In places the granite is laid bare by erosion, in others it is covered by thousands of feet of stratified rocks. Near the contact with the granite the sedimentary rocks have been intruded by dykes, stocks, and sills originating from the main batholithic mass. In these zones of marginal contact many of our



most important ore-bodies have been discovered, both in the igneous rocks and in the sedimentaries.

### Local Geology of the Camps

In the Slocan the ore-bodies occur in sheared fissures in the Carboniferous slates and limestones of the Slocan Series, in close proximity to porphyritic dykes and occasionally in the porphyry.

The Rossland ore-bodies are associated with basic igneous rocks. The great deposit of silver-lead-zinc ore of the Sullivan mine is a replacement deposit in argillaceous quartzites. Its mode of occurrence and the character of its ore are said to be similar to certain deposits in the Coeur d'Alenes. I am not aware of any igneous rock having been encountered in the mine workings, but the deposit occurs in an area that has been intruded by the gabbros locally known as the Purcell sills. Unlike the main range of the Selkirks, the Purcell mountain area is mostly underlain by sediments of pre-Cambrian age.

In both the East and West Kootenays the mineralized zones following the trend of the Purcells and Selkirks can be traced from near the international boundary far into the undeveloped and practically unexplored areas in the northern extremities of the district.

### The Ores of the District

The predominant ores of the district are silver-lead-zinc, although gold ores have been mined extensively and are distributed over a vast area. Rossland in past years has been the main source of gold, not only for this district but for the whole of British Columbia. The camp has been rather quiet for the last year or so, but big things are expected when the large concentrator at Trail will be available for the low-grade ore of this camp. According to reports, the Consolidated Mining and Smelting Co., will have this plant in readiness shortly after their new concentrator at Kimberley is completed.

Quartz-filled fissures in schists, quartzites and granite are the most common type of gold deposits found throughout the district. Outside of Rossland, the Nelson division has been the largest producer of gold in this district; in it are the famous camps of Ymir and Sheep Creek. Here again we find that many of the deposits are in close proximity to intrusive igneous rocks. Placer gold exists in a number of localities, notably Big Bend and Wild Horse creeks, where work is being carried on at the present time.

Rossland has also been the chief source of production of copper. There are a number of copper prospects throughout the district, some of which give promise of substantial production; but so far little development has been done. The most promising areas for prospecting would appear to be in the Fort Steele and Revelstoke mining divisions.

There are known deposits of hematite, arsenopyrite, magnetite, barium, molybdenum, antimony, gypsum, asbestos and chromium, which may have commercial values but at present are not being mined.

### Mining Conditions Favourable

Generally speaking, the natural conditions of the Kootenays lend themselves to mining. There is usually a abundant supply of timber available for mining purposes and sufficient water-power for milling and mining operations. In most cases the ore-bodies can be attacked by adit tunnels, thus eliminating the expense of pumping and hoisting. The climate is healthful and invigorating. I would judge that the average elevation of the mines is about 5,000 feet, while that of the valley floors ranges from about 1,500 feet to 3,000 feet above sea level.

I believe there has never been a more favorable time than the present for mining silver-lead-zinc ores in the

history of this district, except perhaps during a short period of abnormal conditions produced by the war. Metal prices are good and smelting rates favorable, and for the first time in the history of British Columbia, zinc ore and concentrate are acceptable to the Trail smelter. The shipper receives payment for the zinc and silver values contained, providing the value of the latter is sufficient to pay for smelting the residue from leaching. This has had a far-reaching effect throughout the district, and has greatly stimulated the mining of zincky ores, which heretofore were looked upon in many cases as a liability rather than an asset.

### Abandoned Properties now Producing

During recent years a remarkable feature of the Slocan, which has great significance in connection with future developments, has been the result obtained by opening up and developing abandoned properties. For instance the "Queen Bess," after lying idle for a number of years, was re-opened by Clarence Cunningham in 1916, with the result that an ore-body was developed that yielded something like \$1,000,000 clear profit. Further development at the "Wonderful" has disclosed the vein in place, and the big mill at Alamo is now running on ore from this property. The "Ruth" is another property that has been lying idle for a number of years. In 1921 it was re-opened by leasers, who soon uncovered a good showing of high-grade lead ore. Last year the property was acquired by a Vancouver syndicate and development has been steadily proceeded with. The results obtained have been highly satisfactory and it is probable the property will soon become an important producer. The "Slocan Star" is not quite in the class of abandoned properties, but ore was becoming scarce and prospects did not look bright just before the big ore-shoot was discovered on the 1,000 foot level in 1918. It is now a regular payer, and the leading producer of the Slocan. There are many other instances, not only in the Slocan, but elsewhere in the district, of the value of many of the abandoned mines.

### New Metallurgy Aids Old Properties

In considering the possibilities offered by some of the old abandoned properties, we must visualize the conditions that existed during the earlier history of the camps, and must appreciate the following facts: The improvement in ore concentration due to oil flotation allows a much better recovery of the silver values and cleaner lead and zinc products. Dry silver ores, carrying values in grey copper and argentite and possibly other silver sulphides, were not amenable to concentration before the introduction of the oil flotation process. Now it is possible to make a good recovery of the silver values in such ores. Lastly, and possibly most important of all, we have now a more intimate knowledge of the geology and character of the deposits; hence development work can be conducted with greater intelligence. So today it is possible to work properties at a greater margin of profit than formerly, and in some cases the present-day economies were not possible in the earlier days. A great deal of Spokane capital has been invested in the Slocan and Ainsworth divisions; but I would like to point out that undoubtedly there are opportunities in other parts of the district, for the rocks of the Slocan series traverse the Trout Lake and Lardeau divisions and can be traced far north of the main line of the C. P. R. into the Big Bend district. There are a number of properties in this zone that are well worthy of careful investigation, and I fully expect to see more activity in this part of the district during the next few years.

### East Kootenay Mines

In the East Kootenay the bulk of the tonnage of silver-lead-zinc ore has been produced by a small group of prop-



erties in the Cranbrook area, namely, the "St. Eugene" at Mervin, the "North Star" and "Sullivan." Of these the "Sullivan" is the only property being actively worked at present. It is probably the largest deposit of lead zinc ore on the continent, if not the world, while the "St. Eugene" and "North Star" have both produced large tonnage. In the northern part of the East Kootenay, mining activities are mostly centered in the Windermere district, where the "Paradise" mine has been an important producer for a number of years. The predominant ores in this area are also silver-lead-zinc and occur in limestone and argillite. It is extraordinary that in a distance of 60 miles between the Windermere camp and the "Sullivan," no silver-lead ore deposits of any great commercial value have so far been discovered. The same applies to the stretch of country between the "Sullivan" and the "St. Eugene," a distance of about 30 miles.

In the Windermere country there are a number of promising prospects, and the same applies to the Golden area to the north.

The East Kootenay mountain area comprises a vast expanse of country which, it is safe to say, has not yet been thoroughly prospected, and for all we know there are other deposits just as important as the "Sullivan" and "St. Eugene" lying hidden on the slopes of these mountains.

### ENGLISH MINING CAPITAL IN CANADA

The Anglo-French Exploration Company of London, which has invested substantial sums in Canadian mining companies during recent years, held its annual meeting last month. Canadian mining securities now take a prominent place in the Company's assets. The chairman mentioned that "the company has, for the last 33 years, terminating 31st December, 1922, been enabled to distribute out of its liquid resources in dividends, interest or return of Preference capital something like £2,097,600, besides which the company has never gone through any reconstruction or writing-off of capital."

The company's securities in the Rand mines were reduced during the year, and it was noticed that their Australian and Canadian interests improved, while oil holdings in Trinidad were very successful. Of Canada, the chairman said:

As regards Canada, which presents a likely field for our operations, a good deal of attention has been drawn to Canada during the last few months. The phenomenal success of the Hollinger mine and the recent developments at the Keeley mine and at the Premier have been much in evidence of late. We have been represented for the last 12 years by Mr. J. B. Tyrrell, whose knowledge of this vast territory is probably unequalled, and whose qualifications as a geologist and mining engineer are well known. You will perhaps remember that some six years ago, Mr. Tyrrell attended our annual meeting and spoke to us about Canada. I should like to quote the following paragraph from a paper read by him in December last before the American Association for the Advancement of Science. He said:—

"At the present time our country offers a field for extensive and intensive research second to none in the world. One of the main objects of that research should be the finding of bodies of ore which could be economically developed and utilized for the benefit of mankind. There is no finer laboratory anywhere than the one in which this research must be conducted, for it was constructed by the Great Architect of the Universe Himself; it is almost limitless in size, in variety of problems to be solved, and in the facilities for solving them."

"I think no better description could be given than this. There is no doubt that enormous mineral wealth lies buried in Canada's 3,750,000 square miles, which is an area equal to the whole of Europe, including Russia. Its very vastness is, however, one of its difficulties, and it must be remembered that for half the year it is under thick snow, when very little prospecting can be done. As illustrating the vastness of Canada, I may mention that the distance between the two principal mining centres—namely, those in Ontario and in British Columbia—is much the same as between London and New York.

"Most of the mineral deposits of Canada have, I believe, been discovered by accident; for example, it has been stated that the placer gold mines of the Klondike were discovered in 1896 by an Indian woman as she was going to draw water from a well; but in any case it was an accidental discovery made by untrained people. As a result of this accidental discovery, the Klondike produced millions of pounds' worth of gold. A somewhat similar thing occurred in connection with the nickel mines near Sudbury and the rich silver mines at Cobalt, which were discovered by men working on the railways, while what is now the Hollinger mine, in Porcupine, one of the greatest gold mines in the world, was traversed for a century or more by traders before the gold-bearing veins were discovered some 13 or 14 years ago. To-day the country is being prospected in all directions, and the prospector has not to depend solely upon his luck, as he has the records and assistance of the Geological Survey of Canada and of the Geological and Mining Bureaux of the various provinces to direct his steps to places where the geological formation is favourable to the occurrence of ore bodies. Under these conditions it will not be surprising if this great country is forced to disclose its hidden treasures, and that we may see a great advance in the development of the mineral resources of the country. We are fully alive to these possibilities; we are watching the position very closely, and you may depend upon it that we shall be well informed as to any new discoveries or developments.

"Our Canadian business has so far shown us a profit and we are at present in one or two promising ventures. We have the organization to deal with any fresh business which may come forward, and should the prospects justify it we are prepared to strengthen our organization to deal with it."

### MINERALS OF SOUTHWEST AFRICA

The mines of the Southwest Africa Protectorate are described in a recent number of the *South African Engineering and Mining Journal*. Only the merest fringes of its 400,000 square miles has been explored for minerals, and its geological features make it unusually attractive to prospectors. During the German occupation some mines were opened up, and some of these are being operated. The most prominent mineral deposits are the diamond diggings near Kolmankop, which were discovered in 1908. The diamonds occur in alluvial deposits along and near the seacoast, in an arid region. In 1919, before the slump in the diamond market, the output of the various properties was 462,000 karats of a value of £1,500,000. At Trumeb in the Grootfontein district there are important high-grade deposits of mixed copper and lead ore. This is partly smelted on the spot and partly exported in the raw state through the port of Wallvis Bay. A smaller copper deposit, provided with a 50-ton concentrator but not now being worked, is the Khan mine, in the southeastern part of the Protectorate. Tin ore in small amounts is being produced from placers in the Erongo mountains. No coal has been found in the Protectorate.



## JOSEPH KEELE---AN APPRECIATION

By WYATT MALCOLM, Geological Survey of Canada.

In the death of Joseph Keele on June 11, 1923, Canada lost a most faithful and efficient public servant. As Mr. Keele was not accustomed to announce the results of his work with a blare of trumpets, his contributions to the development of Canada's resources were not fully appreciated by the general public. But those who were most thoroughly conversant with his work and most competent to judge of its merits appraised it at high value.

Mr. Keele was born at Parsonstown (Birr), Kings county, Ireland, on December 24, 1863. He came to Canada at an early age and spent his youthful days in Peterborough and vicinity. He graduated with honours from the School of Practical Science, Toronto, in 1893 and the following year took the degree of B. Sc. with honours at the University of Toronto. From 1894 to 1898 he served on the staff of the School of Practical Science. One cannot imagine his service in this connection as anything but highly satisfactory. The thoroughness with which he planned his work, the precision with which he carried it out, and the convincing though quiet tone and unostentatious manner in which he expressed himself were qualities that fitted him eminently for the task.

His first employment with the Geological Survey was as assistant to the late Dr. A. E. Barlow in his well-known investigations in the pre-Cambrian geology of Hastings county. His appointment to the permanent staff of the Survey was made in December, 1901.

In his earlier independent work he carried on geological explorations in Yukon and Northwest Territory. One of his most important exploratory trips consisted in ascending Pelly and Ross rivers in Yukon, crossing Mackenzie mountains, and descending Gravel river to its junction with the Mackenzie in 1907 and 1908, a trip that necessitated his wintering in the mountains, and that meant hardship and a severe test of physical endurance. Of such matters, however, Keele was extremely reticent; his modesty permitted him to speak but little of personal matters and his sense of duty well done was his best and most gratifying reward. Readiness, on the other hand, to recognize merit in others is illustrated by the following tribute to his assistants on this exploration: "It is impossible to speak too highly of the services rendered by these two men; suffice it to say here that owing to their skill, energy and foresight, an expedition, which in less capable hands was liable to be attended by disaster at any stage, was carried through in safety and comparative comfort."

He was an enthusiastic student of glacial geology and when the Geological Survey decided to institute investigations into the clay and shale deposits of the country and their application in the ceramic industries, there was probably no member of the staff better qualified by temperament and training to undertake this work than Keele. The work was initiated under the direction of Dr. Heinrich Ries of Cornell University. After some time spent in co-operation with Dr. Reis in the field and in the laboratory of Cornell University, Keele continued the investigations independently.

In his work on the clays and shales he discovered

himself. Few individuals have ever fitted with finer adjustment into their chosen callings. He was seldom happier than when testing the raw materials used in the clay products industries, advising the practical man on methods of procedure for obtaining the best commercial results, or testing the artistic effects of some new kind of glaze. It is for his work in clays and shales that he is best known, and it was in this work that he made his most valuable contribution to the industrial progress of his country. His training as a geologist enabled him to see his subject from a different angle from that of the pure technologist, and to derive great pleasure from its pursuit. He was especially interested in the growth of industries for the manufacture of the better grades of clay products, and aimed at the development of a type of artistic pottery distinctively Canadian in material, form and decoration. It is to a great extent through his efforts along this line that the teaching of pottery was introduced into some of the public schools of Canada.

An interesting thing in connection with his clay investigations was his discovery in eastern Canada of pre-Glacial sediments that are believed to be of Cretaceous age.

Mr. Keele was transferred to the Mines Branch of the Department of Mines in 1916, where he continued his investigations in ceramics. In 1921 he was promoted to the position of Geologist in the Geological Survey of Canada, a position which he held until his death. He was a member of the Canadian Institute of Mining and Metallurgy and of the American Ceramic Society.

During the winter of 1922-23 he made a trip to the Mediterranean, ascended the Nile, and visited the tomb of the ancient Egyptian king Tutankhamen. The previous winter he visited Australia and New Zealand. These trips were full of enjoyment, as Keele was a keen student of geography and of the relationship of man to his physical environment. Moreover, he had a sharp eye for what other countries and civilizations, ancient or modern, had to teach regarding ceramics.

He will be remembered by many Ottawans as one who in a quiet pleasing manner related the story of his trip up the Nile, and painted vivid pictures of modern Egypt and its past greatness. By his colleagues he will be remembered as a friend, unobtrusive and free from self-seeking, who sat and chatted in a cool, collected manner, with clear reason and sound judgment, about interesting geological problems or questions pertaining to the welfare of the institution with which he was connected, ending frequently with a half humorous, half cynical remark about the frailties or foibles of humankind.

He had an acute sense of duty, and we can well believe that it was through no spirit of adventure but rather through a feeling of obligation to the country of his adoption that he was led to don the soldier's uniform at the time of the Northwest rebellion.

He was intensely loyal to his country and to the Government department of which he was a member; and was at all times actuated by what in his judgment conduced to the best interests of both.



# BOOK REVIEW

## EL ARTE DE LOS METALES (METALLURGY)

Translated from the Spanish of Alonzo Barba, by Ross E. Douglass and E. P. Mathewson. Published by John Wiley & Sons, Inc., 432 Fourth Avenue, New York. 276 pages.

It speaks well for the translators of this priceless relic of another age, and equally well for the publishers, that they were moved to enrich our literature with a gem that would otherwise be lost to all those of us unfortunate enough to be unable to read Spanish.

Alvaro Alonzo Barba, Master of Arts, was Curate of the Parish of San Bernardo, Potosi, Bolivia. His work, the earliest extant on American metallurgy, was originally presented as a report to the Deputy of the Crown in the year 1637. It was approved and recommended to the Crown for publication by the Deputies of the Royal Village of Potosi and the Amalgamators' Guild. It was first printed in Spain in the year 1640, and reprinted twice thereafter, in 1675 and in 1729. Numerous translations into German and French appeared within the succeeding century. Only one very inadequate English translation, that of the Earl of Sandwich, appeared. The noble earl, who was Ambassador Extraordinary to Spain, did half of the book into our language in 1669, but failed signally in his attempt to interpret the technical terminology of the volume. The present translation was made from the Madrid Edition of 1729, the text of which was carefully compared with that of the first edition (1640) copies of which are preserved in the British Museum. Tradition has it that the first edition was banned by the Inquisition.

The volume is divided into five books entitled, respectively:—

- (1) The Manner in which Ores are Begotten, and the Things that accompany Them.
- (2) Amalgamating Gold and Silver Ores.
- (3) Treatment of the Ores of Gold and Silver by Cooking (Pan Amalgamation).
- (4) The Reduction of all Classes of Ore by Smelting.
- (5) Refining and Parting Metals.

Barba's geology, of course, was tinctured with the fantastic speculative thought of his times. But his attempt to simplify and co-ordinate the mass is wholly praiseworthy. For instance, in discussing the genesis of stones, he writes thus:—"Stones have their varying forms which distinguish them into different species. Ignorant of the conditions, we define them by indefinite terms based on their outward appearance and irregularities. The form of each one is accompanied by its special virtues, which are much greater than those in plants and animals, being in proportion to the greater length of time occupied by nature in their generation." The workings of a truly philosophic mind may be seen here. Again, in discussing the creation of metals, he writes:—"If dryness predominate in the mixture, stone results; and if it has a greater amount of greasy water in it, metal results...and thus they flow and melt under the action of heat...Many of the generality of people, in order to avoid profound discussion, say that in the beginning of the world God created ores in the form in which they today exist and are found in their veins. This is an offence to nature, denying to her, without any reason, the productive virtue she possesses in all sublunar things. Furthermore,

"experience in many parts of the world has proved to the contrary." This last sentence is naïvely indicative of Barba's real value.

In Chapter 19 of the First Book, Barba defends the opinion of those who claim that mercury and sulphur are the essential components of metals. "It is of no importance", says he "that they try to show that metals are not composed of sulphur and mercury by saying that these substances are not present in their mines; for these, as component parts, acquire a different nature from that in which they were created, and abandon their primitive form." There is no controverting this kind of argument, and so, we suppose, Barba's opponents were squelched.

When Barba begins to treat of practical matters, the details of metallurgy, he is much more at home. Homilies against the errors of ignorance are interspersed throughout. The volume concludes thus:—"Most rare in the World is it to find persons who have obtained some advantage from their knowledge of the art."

A word as to the translation. Messrs. Douglass and Mathewson have done their work with more than scholarship. They have shown sympathetic understanding and discriminating skill. The result is that we have not, what any student of Spanish could give us, a mere transliteration; but we do have a vital translation in which the idiomata of the original are preserved and in which the beauty and dignity of Barba's language are not lost. Indeed, the achievement of the translators is something of which all mining men may well be proud. It could have been done only by ardent and informed lovers of good books.

J. C. MURRAY.

## KNIGHT CENTRAL'S FINAL MEETING

The Knight Central's last annual meeting of shareholders was held last month, and the chairman's statement contained an interesting summary record of the mine's history. It is one of the smaller of the Rand's mines, for during the 28 years of operation it has crushed but 4,230,000 tons of ore, from which was won gold to a value of £4,970,000. Working capital paid in was £847,000, and the total of dividends, £112,500. When the assets have been realized, the shareholders will have received only half their original subscription, during a period of over a quarter of a century. Extensive exploration of the reef within the Company's ground has failed to disclose payable ore. The financial record of the average Rand mine has, of course, been much more satisfactory than this.

## FOLLOW THE FLOAT

Discoveries of lead ore in the Gaspé Peninsula have been made by finding pieces of float galena, sometimes weathered to a rounded brownish mass, and trenching uphill from these finds. The vein-out-crops usually show only white or brownish quartz, from which the zinc blende and most, if not all, of the galena have been weathered out, leaving the quartz in a cellular condition. Where galena has been left in the quartz, it may have a reddish brown coating.

The French occupation of the Ruhr industrial area has stimulated the chemical industry of the United States by means of cutting off the supply of low-priced chemicals from Germany, which results in an enhanced price for American manufacturers.



# Natural Gas and Petroleum Resources of Western Canada

II. — Progress of Exploration in Sweetgrass District

By NEWTON W. EMMENS\*

The total crude oil in storage in the United States increased during the month of April by 5,889,000 barrels (U. S.) to a total of 263,915,000 barrels, according to the figures of the United States Geological Survey, and operators in the big producing fields are getting together with a view to stopping all unnecessary drilling, and cutting down the output of oil from existing wells with a view to stabilizing the price of crude oil and preventing the further declines that are sure to come if production is maintained at a level so far in excess of the demand.

## The Montana Oil Field

Meantime, drilling in the Kevin-Sunburst field of Toole County, Montana, continues in the proved oil producing area, with some wildcatting to the north, east and west. In this field there are 57 producing oil wells and 8 gas wells. There are 46 wells being drilled, with 37 locations additional that have been authorized. There have been 19 dry holes drilled in the field thus far. The oil production of the individual wells is not spectacular, in spite of some newspaper statements to the contrary, being from 20 to 80 barrels when pumping is resorted to.

## Promising Well on the Alberta Side

On the Alberta side, in the Sweetgrass district, the Imperial Oil Company's test in Sec. 5, Tp. 1, R. 16 W. of 4th Mer. has reached a depth of 2,542 feet. At 2,525 feet a showing of light oil was encountered in what is believed to be the Kootenai sand and some oil was brought up with the bailer. On deepening the hole in the hope of increasing production, water was encountered. Consequently it was considered advisable to set a packer and shut off the water so that the oil-producing part of the sand may be thoroughly tested. This is now being done. This oil showing is the best yet found in the Sweetgrass area on the Alberta side. No oil, gas or water were found in this test-hole above the 2,525-foot level. Several other wells are being drilled in this locality and it is probable that an oil field of commercial importance will be developed on the Canadian side of the border.

## The Central Alberta Fields

Important developments are expected during the present summer from the central Alberta fields, where the Imperial Oil Company and British Petroleums are carrying out a comprehensive development programme following the successful drilling of test wells in the Irma-Fabyan-Wainwright sections. While no commercial oil pool has thus far been developed, it is a fact that every well drilled to the Lower Cretaceous strata has found oil; but it is the variety to which the name "maltha" has been given, being the heavy residue left after the more volatile portions of the original crude oil have been driven off. It is the opinion of the writer that a careful and systematic search will result in the discovery of commercial oil pools in central

Alberta, where the rocks have been subjected to less metamorphism than is the case in the Irma-Fabyan-Wainwright field and that the guide to such a discovery lies in the study of the carbon ratio of the coal or coaly deposits that occur in the strata overlying those containing petroleum (both liquid and gaseous). In addition to the "maltha" found in the wells as above referred to, large flows of natural gas have been found. This gas is now being tested and experiments are being carried on with a view to its profitable use.

## PETROLEUM IN ENGLAND

It is not commonly realized that England has an oil well whose annual production exceeds that of the average well in the United States. It is near Hardstoft in Derbyshire. The Duke of Devonshire has lately acquired a concession of approximately five square miles in that vicinity for the purpose of sinking further wells. It is possible that a considerable quantity of oil will yet be found in England, as exploration for it has barely been commenced.

## CANADA'S OIL REFINERIES

With the exception of the United States, Canada ranks as the greatest user of automobiles in the world, on the basis of population. The amount of fuel which these motor vehicles annually consume reaches millions of gallons, and to supply this enormous demand a very extensive and lucrative industry has been built up in Canada. According to the Dominion Bureau of Statistics, there were in operation in Canada in 1918, 10 petroleum refineries, three of which are located in Ontario; three in Alberta; and one in each of the provinces of Nova Scotia, Quebec, Saskatchewan and British Columbia.

Capital invested in these various refineries during the fiscal year 1918 amounted to \$35,745,410, of which \$23,535,257 represented land, buildings, fixtures, machinery and tools. Bills receivable, cash, trading and operating accounts amounted to \$407,408, while materials on hand, stocks in process, finished products, fuel and miscellaneous supplies on hand were valued at \$11,802,745. The cost of fuel used in the refineries was \$3,242,796, of which sum, oil and gasoline used represented \$1,721,642; 247,423 tons of bituminous coal worth \$1,425,850; and the balance, or \$95,304, for petroleum, coke and natural gas.

According to reports 262,641,149 gallons of crude oil were received at the refineries, of which quantity 12,258,184 gallons were from Canadian wells and 250,382,965 gallons imported. The total cost of oil received at the works was \$23,708,659, of which \$22,789,762 was paid for imported oil and \$918,896 for the product of Canadian wells. Petroleum and petroleum products imported were valued at \$13,127,178, of which \$13,359,616 was paid for 229,010,561 gallons of crude oil imported by oil refineries to be refined at their own plants.

\* Petroleum Engineer, Vancouver, B.C.



### Wage Earners and Wages

The average number of wage earners engaged in these industries was 2,968, and the wages paid allowed a per capita payment of \$1.15 or a total sum of \$3,413.92. Wages paid to 272 salaried employees amounted to \$71,676, or an average of \$1,366 each. The total wage and salaried employees was 3,240, while wages paid totalled \$4,874,318.

The selling value of the subsidiaries of the total production was \$17,800,907. Of this sum \$19,247,402, or 50.8 per cent., was the value of 72,169,916 gallons of gasoline and motor oils; \$7,130,301, or 18.8 per cent., the value of 56,220,066 gallons of illuminating oils, and \$6,629,980, or 17.50 per cent., of 84,784,278 gallons of fuel and gas oil and tar.

Practically all the products of the refineries were consumed at home, a small quantity, however, being exported. Crude coal oil or kerosene exported in 1918 amounted to 370,309 gallons valued at \$28,415, and of refined oil 1,946,967 gallons, valued at \$206,675. There was also an export of naphtha or gasoline of 91,229 gallons valued at \$28,788. — "Agricultural and Industrial Progress in Canada."

### PERSONAL AND GENERAL

Dr. H. Foster Bain, director of the Bureau of Mines, has been deputed to visit Chile for the purpose of securing an authoritative estimate of the tonnage of nitrate available there. Such an estimate is desirable to aid the Government authorities in arriving at a logical and commercially sound policy for the manufacture of synthetic nitrates in the United States.

Mr. H. S. Denny, who has paid a professional visit to the Kirkland Lake gold camp, will visit some properties in the gold-silver camp north of Stewart, B. C., to which the Premier Mine has drawn world-wide attention, before he returns to London.

Mr. D. H. MacDougall, who held conferences with the representatives of the Cape Breton steel workers last week, is to confer with the directors of the British Empire Steel Corporation in Montreal this week relative to the steel workers' requests.

Hon. Robert Drummond, of Stellarton, Nova Scotia, continues to be the active public proponent of the coal and steel industries of his province. In a recent issue of the *Financial Post* he explained how the unduly high cost of coal in Nova Scotia cripples a steel industry that should be one of the most important in the world.

Dr. Leopold Reinecke, well known in Canada as a former member of the Geological Survey, is now in consulting practice in Johannesburg, South Africa.

Mr. H. S. Munroe, General Manager of the Granby company, was in Allenby last week, inspecting the Copper Mountain mine and concentrator. He was accompanied by Colonel Crabbe, President of the company.

Mr. J. B. Haffner has been appointed General Superintendent for the Granby company at Aiyon.

It is estimated that the value of the silver-lead ore now being shipped from Mayo, Yukon Territory, will be \$1,250,000, and that the season's gold output will be over \$1,500,000, the highest total for years past.

Nickel-chromium alloys, while resistant to a great many kinds of corrosive liquids and gases, have been found by experiment to be attacked by sulphurous gases.

### EXPLOSIVES SAFE WITH CAREFUL USE

Investigations conducted by the United States Bureau of Mines relative to the hazards involved in the handling of explosive materials indicate that the number of accidents in handling and testing explosives is relatively low; in fact, it is lower than in some supposedly less dangerous occupations. Workers who handle explosives, being aware of the danger, practise carefulness until it becomes a habit; in consequence accidents are relatively few. Accidents from explosives, however, receive more publicity than do most industrial accidents.

Any feeling of nervousness by a man engaged in handling explosives is highly dangerous, as it may result in his dropping a batch of sensitive material or knocking over a piece of apparatus. Men subject to nervousness should overcome it or get out of the industry. All explosives should be treated with proper respect, but it is not necessary to feel that the slightest jar will be disastrous.

The Bureau of Mines estimates that at least 75 per cent. of all the industrial accidents with explosives are caused by hurrying the work and by taking chances where conditions are known to be dangerous; probably 20 per cent. are due to carelessness, the rest having at least fairly excusable causes. The great essential in avoiding accidents is that inexperienced men should be made fully conscious of every movement in handling explosives and should be trained to "play safe" until they are automatically careful all the time. Nearly all men become accustomed to working with explosives and feel no nervous strain, although after a bad explosion only a person of unimaginative temperament can work without excessive nerve fatigue.

In the laboratory a chemist naturally avoids spattering or spilling materials on his clothes or skin, or inhaling the fumes or fine particles of any explosive. Benzene, toluene, aniline, and their nitro compounds, besides other compounds, are known to be poisonous, but so is hydrogen sulphide, which all chemists use.

When preparing samples of explosives many analysts wear rubber gloves, but the usual course is to see that the hands are dry, to avoid direct contact as much as possible, and to wash the hands as soon as the sampling is finished. When possible, it is best to bathe the hands in a dilute solution of sodium sulphite, which acts as a solvent and is not readily absorbed by the skin.

### RADIO STATION FOR DAWSON

Last week the Federal Government voted \$55,000 for the establishment of radio stations at McMurray at the end of the steel in northern Alberta, Fort Simpson on the MacKenzie River, and Dawson in the Yukon, which will displace the telegraph lines at present in use from McMurray northward and into Dawson. The sum voted for the construction of these radio stations is \$55,000, while a sum ranging from \$275,000 to \$300,000 has been voted annually for the last twenty-three years for the telegraph services.

### ASBESTOS ROOFING IN INDIA

The Canadian trade commissioner in India reports that there is at present a good demand for asbestos roofing of good quality from the railways and public works departments. Iron roofing is of comparatively short duration in the climate of India, and asbestos roofing has proved to be eminently suitable for use in these tropical conditions.



# CANADIAN VICKERS

Plant Now Adapted to General Industrial Construction

Canadian Vickers, like the parent firm in England, began its career as a ship-building establishment, based principally upon the express intention of our Federal Government of ten to fifteen years ago to build up a Canadian navy, composed of vessels built in Canada. A very substantial plant was put down in Montreal and a corps of highly-trained engineers and mechanics gathered, principally from England, to man the works. The plant did notable service during the war time, not only in the building of small naval craft, merchant ships, marine boilers and engines and ship accessories, but in the manufacture of shells as well.

The after-war conditions have necessitated a radical change in the plans of Canadian Vickers. Their large floating dock and the dry-dock will always be a necessary part of the port of Montreal's facilities for ship repairs; but the possibilities for ship-building are reduced to special craft such as dredges and tugs. Consequently the firm has had to extend its activities in other lines.

## Present Industrial Activities

General industrial construction now constitutes an important part of Canadian Vickers' work. The machinery and equipment used for ship-building is especially suitable to handle heavy industrial construction, while the shops designed to make marine engines and accessory marine machinery can handle a very wide range of construction, both heavy and light. A sep-

arate draughting office has been equipped for the purposes of this work and additions made to the staff to cope with it effectively, and already there has been turned out of the shops a wide variety of machinery and equipment for land use. Mine skips and cages, mine cars, ball and tube mills, crushers, elevators, and other mine and mill equipment have been turned out recently for Canadian mines, and the shops are ready to make steam and electric hoists, screening equipment, all kinds of steam boilers, heavy duty rolls, and special work for mines.

Heavy plate work can be handled with unusual facility in the powerful machinery designed for ship construction. There were recently completed some tanks made of two-inch plate, welded and rivetted, designed to withstand a test pressure of 750 pounds per square inch, for oil refinery use. Revolving asbestos dryers are also a product of this part of the shop. In addition, lighter plate work, where required to be of first rate construction, can be made economically in this department.

The engine and machine shops are still at work on marine engines and deck machinery; but their scope has been enlarged by the manufacture of the Vickers-Petters semi-Diesel oil engine.

## Aeroplanes

A new department has been opened recently that may have soon a direct bearing on the mining industry. An aeroplane department has been organized in close



Canadian Vickers' works at Maisonneuve, Montreal, showing 25,000-ton floating dry-dock, ship-building sheds, fitting-out wharf and shops. In the floating dock is an ocean liner.



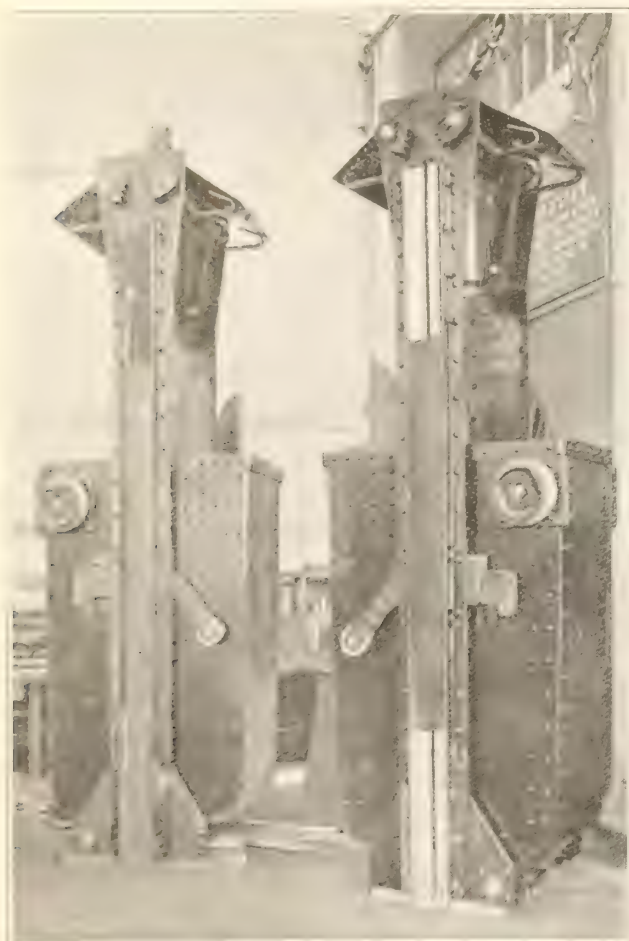


Vickers Viking Amphibian, with 50-foot wing spread, accommodates pilot and five passengers. It is especially suited to Canadian conditions, as it is rugged in construction, has a wide radius of flight, and can travel on land and water as well as in the air.

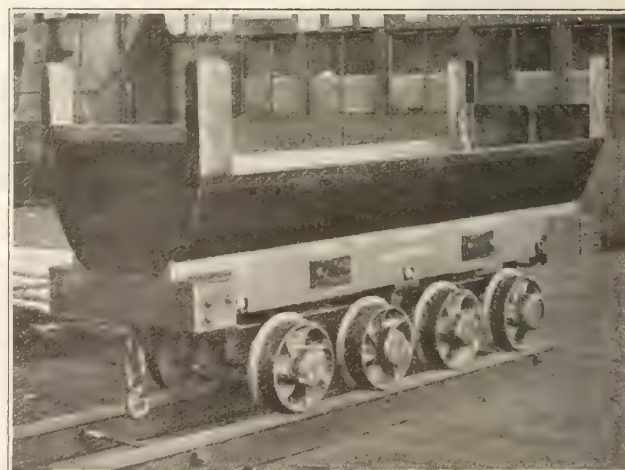
co-operation with the Vickers Air Craft Works at Weybridge, England, but with a special view to Canadian conditions. Its activities were inaugurated recently on receipt of an order from the Dominion Air Board for eight Vickers Viking Amphibians which will be powered with Rolls-Royce "Eagle" engines. This represents a class of aeroplane developed since the war, and especially suited for use in Canada. It is equipped

to arise from, and alight on land or water at will, and for the landing wheels can be substituted skis, which permits uninterrupted use during the winter months. The undercarriage with wheels is drawn up beneath the boat that forms the fuselage when not required, and let down again at will by the pilot. The term "Amphibian" has thus a specific and special meaning, as the craft is literally able to travel alternatively on land or on water at will. This option has been shown by test to result in a much longer life for the Amphibian than for seaplanes or flying boats, which must be carried or hauled from the beach to their hangars, with consequent damage to their hulls and wings. The independence and complete adaptability of the new type overcomes this difficulty.

The Vickers Viking has a span of 50 feet and a length of 33½ feet. The wings can be folded to a width of 33 feet 10 inches. The standard engine equipment is a 450 horse-power Napier "Lion," and drives a pusher airscrew. The net weight is 3,728 pounds, or 5,600 pounds with fuel and load. It accommodates five passengers, or the pilot and 1,070 pounds of baggage. The normal speed in flight is 119 miles an hour, and the landing speed 50 miles per hour. The range at 6,000



3-ton mine skips made for the McIntyre Mine, Porcupine.



Special car for carrying drill steel, built recently for the Hollinger Mine.

feet elevation and at full speed is 350 miles, and at a reduced speed of 90 miles per hour, 480 miles. The climbing qualities are remarkable; the time to 6,000 feet is 7.35 minutes. The "ceiling" is at 18,250 feet.

The Vickers Viking "Amphibian" has been tried out thoroughly not only in England but here in Canada, where the Laurentide Air Service, Limited, a private company, have used it for two seasons. It is noteworthy that it was the only machine to be awarded the British Admiralty £10,000 prize for amphibian machines against numerous competitors. Thus the first of Canada's aircraft factories is now making, not only the latest and most effective post-war type of machine, but one most completely suited to Canadian conditions.

#### Vickers Agency

Besides these and other facilities for construction in Canada, Canadian Vickers are agents for the parent company in England and for the extensive association of firms connected with them. Vickers Limited own or control works throughout England manufacturing almost every sort of industrial or domestic appliance, from stainless cutlery and automobiles to heavy ordnance and gold dredges. Many of these products are not yet made in Canada, and are thus made readily available from the workshops at the centre of our Empire.

### EXPERIMENTAL BLAST FURNACE OPERATES SUCCESSFULLY

Details of an entirely successful test run of the experimental blast furnace operated by the United States Bureau of Mines at the North Central experiment station, Minneapolis, Minn., have just been received by the bureau. This test run marks the culmination of four years of experimentation by the Bureau of Mines, in co-operation with the University of Minnesota, in the development of this blast furnace, which is unique in the field of industrial research. During the entire run every phase of operation of the furnace was under complete technical control. Several tons of commercial gray iron and of spiegeleisen were made. With this demonstration of the possibility of operating an experimental blast furnace, with every detail of furnace operation under technical control, it is believed that the investigators at the Minneapolis station are now in a favorable position to undertake the study of various problems, the solution of which should be of great practical value to blast furnace operators.

After blowing in, the furnace was operated as a slagging type gas producer until it had reached a steady state thermally and chemically. A series of thermal-couples, located at five elevations in the mantle, were used to determine the travel of the heat wave up the charge column as the cold material used in filling the furnace gradually acquired heat from the ascending gases generated by combustion at the tuyere zone.

When the top temperature indicated that the furnace had reached a steady state, iron ore, without the addition of flux, was charged and its descent in the furnace was followed by means of gas samples taken from various planes up the side of the mantle. It was found that reduction began shortly after the iron ore had been charged and was completed at a point remarkably close to the stock line. The ore used in this experiment had been sized so that the particles were a little smaller than garden peas. When the effect of this charge had been dissipated, more of the same size iron ore was charged without any lime stone and another set of gas samples was taken.

The purpose of these experiments was to obtain a com-

parison of the gas composition at various planes of the furnace when no reduction was taking place and when an iron ore burden had been charged. Such a comparison indicates the levels in the furnace where reduction starts and where it is completed.

Without changing any of the operating details the physical character of the burden was changed to a less homogeneous ore size (ore particles varied from pieces about two inches in diameter to fine ore). A black slag, indicating incomplete reduction, appeared after this burden had been charged a sufficient length of time for it to pass through the furnace. The burden on the furnace was decreased and the scouring slag disappeared.

Several rounds of fine ore were next charged and the reduction at the stockline was found to be greater than when a coarser ore was used. This was indicated by higher carbon dioxide.

These examples are cited to indicate how a study was made of the effect of sizing of ore upon its reduction in the blast furnace.

An iron ore burden was charged continuously for several days, approximately three tons of gray iron being made per day. Towards the end of the run several tons of spiegeleisen were made from manganiferous iron ore from the Cuyuna Range. Gas samples were taken on this ore, as well as on the iron ore, from five elevations in the mantle during the operation.

The furnace was operated for twelve days and blown out empty and in good mechanical condition. No serious difficulty was experienced in operating the furnace. A large number of gas, slag and metal analyses are yet to be made. Likewise, a number of temperature, pressure, and other readings are to be studied.

### CHROMIZING

The metal chromium has for many years been used for making alloy steel, but its power to resist corrosion and to confer this property on other metals when alloyed with them is a comparatively recent discovery.

Mr. F. C. Kelley, in a paper read at the New York meeting of the American Electrochemical Society, May 3-5, gives the results of an investigation which had for its object the application of the well-known principle of "cementation" to chromium. The "case-hardening" of soft iron by heating it, below its melting point, in a bed of charcoal, is an old process, illustrating the power of diffusion of solids, slow indeed when compared with the rapid diffusion of gases, but nevertheless capable of industrial application. Sherardizing (with zinc) and calorizing (with aluminium) are processes in which these metals in the solid state are diffused into the surface layers of other metals so as to confer certain properties on them.

In chromizing, the object is heated in a mixture of powdered alumina and chromium, the alumina being used as a diluent and to prevent sintering. This must be done in an atmosphere free from oxygen and water vapor, either of which would oxidise the chromium at the high temperatures used.

The chromium used in this operation must be at least 95 per cent pure. It is worthy of note that the process for the manufacture of metallic chromium at a high degree of purity was developed in the metallurgical laboratory of Queen's University, Kingston, to make possible the manufacture of stellite alloys. Chromizing may therefore be considered a logical outcome of that valuable piece of research work.

Steel objects when chromized acquire a bright silvery, non-corrosive surface. By a subsequent heat-treatment, the loss of power to stand high tension and fatigue stresses may be restored to the steel.



## COBALT

The metal, cobalt, is a modern product, although its oxide has long been used to make the beautiful small blue of painters and chinaware manufacturers. In a paper presented at the New York meeting of the American Electrochemical Society, May 3-5, Dr. C. W. Danks, gives a short statement of the present position and future prospects of the cobalt industry. The annual world production of about 400 tons of cobalt compounds is not large, but it is forty times as great as it was in 1860. In addition to the metal there are now produced fifteen compounds of cobalt. The metal is used chiefly in the manufacture of stellite and as one of the main constituents of permanent magnets. The use of cobalt makes possible the manufacture of magnets of half the weight necessary when the ordinary tungsten magnet steel is used.

The oxide is used mainly for coloring in the ceramic and enamel industries, and in the manufacture of cobalt salts. These are used as driers in paints and varnishes, as catalytic agents in the hydrogenation of oils (which converts oils into solid fats), in the preparation of certain printing inks, and in stains in the ceramic industries. In enamels, cobalt is used to neutralize the yellow tinge due to iron.

Ontario provides practically the world's requirements. The strength of her position is due to the fact that cobalt and its compounds are by-products in a mining and metallurgical industry that does not depend on them. It is doubtful if the extraction of cobalt can be made to pay when, as in the West Australia ore, it is the sole product. In the Belgian Congo (Katanga) there are deposits of copper ore high in cobalt, and it was thought that these deposits might supply the demands of Europe and Asia, but the event has so far not fulfilled the hopes entertained.

In the Ontario region, the cobalt content of the ores is decreasing, and with the growing demand for cobalt and its compounds, there seems to be no danger of an oversupply, but rather the contrary.

## SOCIAL AND ECONOMIC CONDITIONS IN THE DOMINION OF CANADA.

This is the title of No. 196, Vol. 107 (May 1923) of *The Annals of the American Academy of Political and Social Science*, edited by Clyde L. King. The editor in charge of this volume is W. P. M. Kennedy, M. A., Litt. D., of the University of Toronto. The social and economic conditions of Canada are discussed by some forty-four writers, mostly well-known Canadians. Part I is devoted to *Population*, about which there are some interesting statistics, not the least so being the statements of the Quebec Provincial Statistician, that 5,800 French immigrants, the estimated number arriving between 1634 and 1759, were the parent stock of the whole French race in America, now numbering 3,500,000 souls, a population six hundred times greater than the number of original colonists. In eight short essays other writers discuss such aspects of Canadian population as growth, migration to the United States, the immigrant settler, Oriental immigration, the aboriginal races, and Canada's immigration policy.

Under Part II, *Resources and their Development*, the mineral resources of Canada are discussed by Mr. Balmer Neilly, Secretary of the Ontario Mining Association. Mr. Neilly begins by quoting from the presidential address of Dr. C. V. Corless to the Canadian Institute of Mining and Metallurgy, a passage that should have the widest possible publicity. We reproduce it here in order to compare its statements with that of the Dominion Statistician (p. 5),—

"Canada is predominantly an agricultural country." According to Dr. Corless, "We live in a country whose greatest permanent sources of wealth are its soil and its minerals. But few people, however, realize that not more than about fifteen per cent. of its entire surface is suitable for profitable cultivation. Of the two largest provinces generally considered as mainly agricultural, the proportion is probably less than ten per cent. I shall endeavor to show that the remaining eighty-five per cent contains mineral treasures of inconceivable value."

Taking this as his text, Mr. Neilly lays before the reader of *The Annals*, an imposing array of what Canada has so far accomplished in developing this field. The result can be summed up in the statement that in the thirty-five years from 1887 to 1921, the value of the annual mineral production has increased fourteen-fold. During that same period the population has not quite doubled.

In Parts III to IX there is a comprehensive survey of education, transportation, money and banking, foreign trade, public finance, Canada's rural problem, the agrarian movement, protection of workers in industry, labor problems, etc., the sustained interest being assured by writers of wide and varied experience, among whom may be mentioned, Sir Edmund Walker, John Lewis, Sir Thomas White, W. C. Good, M. P., The Hon. H. S. Beland, J. S. Woodsworth, M. P., and others equally well qualified.

## RAND GOLD PRODUCTION

Production of the Transvaal gold mines for the month of April was 743,651 fine ounces as compared with 761,586 fine ounces in March. These figures show a decrease, compared with March, of 17,935 ounces, but the daily average output was better, as April had two working days less. The value of the April gold output at par (85s per ounce) was £3,160,517, and at the declared value (87s. 6d.) £3,253,473. At the end of April the gold mines employed 178,337 natives as against a total of 181,473 at the end of March. While most of the gold mines are making very satisfactory profits and are on a dividend-paying basis, some are being operated at a loss.

## A NEW NICKEL ALLOY

"Permalloy," a nickel alloy of remarkable magnetic properties, is described by H. D. Arnold and G. W. Elmer in the May issue of the *Journal of the Franklin Institute*. Alloys of nickel and iron containing over 30 per cent nickel show these dielectric properties, but "the most startling results are obtained with an alloy containing 80 per cent nickel and 20 per cent iron, whose permeabilities at small field strength are many times greater than any hitherto known." A revolutionary change in submarine cable construction and operation, as well as other fields of usefulness, is predicted as a result of the discovery of the new alloy.

## FIRES AT MINTO MINES

Legal proceedings have been instituted as a result of fires at Minto, New Brunswick, where a shaft-house and some freight cars were burned in a fire suspected to be of incendiary origin. There had been previously some disaffection among the coal miners employed on the property.

The present ore reserves of the Geduld Proprietary, South Africa, consist of 3,800,000 tons, assaying 8.1 dwts. and 2,500,000 tons, assaying 4.5 dwts. The latter amount is now included in the reserves by virtue of the decreased mining costs following the strike of last year.



# THE MINING DISTRICTS

BY THE JOURNAL'S CORRESPONDENTS

## NORTHERN ONTARIO

**Mineral Production.**—The report of the Department of Mines covering the production of the metalliferous mines, smelters and refineries of the Province for the quarter ending March 31st, shows an encouraging increase, although there is a decrease in both gold and silver. There has been a substantial increase in the output of nickel and copper, due to the renewed operations of the International Nickel Company. Metallic cobalt, cobalt oxide, nickel oxide and nickel-cobalt compounds show large increases, and have an aggregate value of \$1,927,000, as compared with \$355,000 for the same quarter in 1922. Silver, valued at \$1,793,000, shows a decrease of slightly over \$200,000. The Gowganda area did not show any shipments, while South Lorrain was an important producer with 826,775 ounces, Keeley 530,000, Mining Corporation (in Cobalt) 311,000 ounces, and in South Lorrain 297,000 ounces, Coniagas 268,000 ounces. The production of gold amounted to \$4,374,000, a decrease of \$300,000 as compared with the same quarter in 1922. When the severe power shortage however at the mines is taken into consideration, it might have been expected that the decrease would have been much more than this. The Hollinger shows the largest decrease, which amounted to almost 30 per cent. This falling off was due, in a small measure, to the lower grade ore treated, but was almost entirely due to the lack of power. The average grade treated by the Hollinger was \$7.61 per ton, as compared with \$11.12 for the McIntyre and \$12.81 for the Dome. Although the Dome tonnage decreased, the higher heads accounted for the production being about the same. There was a substantial increase in the output of the Kirkland Lake district, which was largely due to the Teck-Hughes. The average recovery of the ore treated by that mine for the quarter was \$29.42, which is the highest in the history of the mine, and is also the highest for the Kirkland Lake district. The average recovery of the Lake Shore was \$22.74, Wright Hargraves \$9.04, Kirkland Lake \$4.80 and Kirkland Lake Proprietary \$6.64.

**Nipissing Production in May.**—The report of the Nipissing Mining Company for May shows that the company mined ore of an estimated net value of \$187,241 and shipped bullion of an estimated net value of \$170,000. The value of the silver was estimated at 65¼ cents an ounce. The production of cobalt amounted to 31,845 pounds. The low-grade mill treated 7,161 tons and the high-grade plant 188 tons. The refinery shipped 253,566 fine ounces of bullion. The company has declared the regular quarterly dividend of 3 per cent, payable July 20th to shareholders of record June 30th. The financial statement as of June 2nd shows cash, investments, value of ore and bullion on hand, in process and in transit amounting to \$4,676,000.

**Mining Corporation in April.**—The report of the Mining Corporation for April shows that the company treated 4,645 tons and recovered 48,050 ounces of silver. The cost of the mine operations amounted to \$34,575. The production from the Company's Cobalt mines was reduced owing to an experimental run of 1200 tons of Peterson Lake ore. During the month the production from the South Lorrain properties amounted to 183,500 ounces.

**Keeley Report.**—The quarterly report of the Keeley Mines, for the three months ending March 31st, shows that there was recovered 423,368 ounces from 6,577 tons of mill ore and 36 tons of hand-picked ore. The gross value of the product was \$278,326.00, from which the estimated profit was \$188,900. Expenditure on capital account, which was not taken into operating expenses, was \$28,817. The ore reserves as of March 31st were estimated at 1,728,000 ounces of silver, with the addition of 1,250,000 ounces if the No. 26 vein goes up 30 feet and carries the same values as in the drift. Developments during the quarter were exceptionally good, particularly on the 7th level. 75 feet of work on No. 26 vein produced 250,000 ounces of silver.

**Colonial Makes First Shipment.**—The Colonial has commenced shipping some mill ore to the Mining Corporation mill. Underground developments have not yet progressed to the point where a regular tonnage can be counted upon, but indications are promising.

**Kirkland.**—The Montreal-Ontario has started a crosscut on the 300-foot level to intersect the two veins cut on the 250-foot level. It is understood that the crosscut showed values up to \$20.00.

An official report from the Kirkland Lake Proprietary has stated that crosscutting has been started on the 800-foot level. The new vein recently found on the fourth level has been developed for a distance of 67 feet and averaged \$6.75 over 57 inches.

The Kirkland Gateway proposes to commence diamond-drilling in order to locate at some depth the extension of the veins found on the surface. Drilling will be done from the 350-foot level.

The shaft of the Harvey-Kirkland is down about 300 feet and will be continued to 400 feet before lateral work is undertaken.

John Taylor & Sons have let a contract for sinking the Queen Lebel shaft to 300 feet. Some encouraging values were found on the surface.

**Larder Lake.**—On the 500-foot level of the Associated Gold Fields the results are the best yet encountered, and the present face shows an average of \$10.00 over a width of 15 feet.

**Porcupine.**—The officials of the Goldale company state that while an informal proposal has been made regarding the amalgamating of the Goldale, Plenaum and Armstrong-Booth properties, no definite steps have been taken and no negotiations of an official nature have been entered into.

The Hayden Mines are cutting a station at the 700-foot level of the shaft, and when this is completed the shaft will be continued to 1,000 feet.

**The Dome Meeting.**—The Directors of the Dome headed off the expected opposition at the Annual Meeting by holding a directors' meeting before the shareholders' meeting and declaring a dividend of \$1.00 a share, payable in July. This is at the rate of \$4.00 a share a year, and is double the amount of the dividend previously paid. The President stated that the vicissitudes of mining would prevent any guarantee as to its continuance, but stated that it would be paid as long as the profits warranted it. The meeting, however, was far from being as harmonious as one might gather from



The propositions and some very pointed criticisms, particularly with regard to the financing of the company, were made. The proposal, however, to separate the local office of the company from the office of the President was voted down. The old board of directors was re-elected with Mr. T. W. Fitts of Rochester, replacing Mr. Frederick G. Corning of New York. The President stated the old scheme of capital re-payment had been abandoned, on account of a change in the United States tax laws which made it possible to tax these returns of capital. In addition there was a very considerable expense in connection with every capital re-payment. With regard to the proposed By-law permitting the formation of a new company with the shares of the old, the directors were authorized to proceed with the formation of this company and the basis on which the shares would be split was left to their discretion. It was pointed out that the present shares of \$9 par did not suit the London market and that stock selling at less than \$10.00 a share was not accepted as collateral in New York. For this reason the proposed exchange of four shares for one share of the old was not considered advisable at the present time, and it might be found advisable to issue two for one at the present time, with the possibility that later on a further split might be made. A most interesting part of the meeting, from the viewpoint of the shareholders, was the statement of the President regarding the possibilities below the 12th level. The annual report pointed to the possibility of the hanging-wall ore-bodies being cut off below the 12th level by an intrusion of porphyry, and this was a disturbing factor with many of the shareholders. The manager pointed out that an almost identical occurrence had been found in 1917 on the 8th level, and that some of the best ore-bodies had been found below that point and above the 12th level. The Dome has, however, now entered the same formation as the other producing mines of the camp, and there appears to be no reason why the ore-bodies may not be found below the porphyry intrusion. The President states that important ore-bodies have been found in the Dome Extension ground, and it was intimated that the company intended to expend \$750,000 on a new deep-level shaft in the Dome Extension ground.

### NORTHWESTERN ONTARIO

**Cross Nickel Property.**—The Julian G. Cross nickel properties, situated on Lower Shebandowan Lake, have been under option to Duluth interests for some time. Extensive surface operations in the way of pits, trenches and stripping have been carried on, disclosing a large deposit of well mineralized ground having a length of one and one-half miles.

Diamond-drilling was commenced last week, for the purpose of determining the depth of the deposit, together with the values carried below surface, the results of which will be looked forward to with interest, as the surface operations give promise of this property developing into one of exceptional value, owing to the variety and nature of the metals in the ore.

Thorough sampling of the surface openings shew that it carries an average, throughout its entire length of one and one-half miles as exposed on the surface, of 2 per cent. copper, 3 p.c. nickel, and some platinum, and also, in places, a notable amount of vanadium.

The property is about 60 miles north-west of Port Arthur, on the Canadian National Railway, immediately south of Lower Shebandowan Lake, and is easily accessible.

Should the diamond-drilling disclose similar values at depth as have been found on the surface, these properties will form the basis of an active mining community, as there is ample capital behind the operators to carry on mining work on a scale adequate to any requirements.

### NOVA SCOTIA

**Steady Shipment of Coal.**—Since June began, coal shipments have been very heavy, and notwithstanding the fact that International Pier, Sydney, is equipped for rapid loading, there were times when a number of large vessels lay in the harbour awaiting their turn. All collieries are now working full time, and operations on the coal heaps are on double shift, with steam shovels going night and day. The output from these two sources runs from 22,000 to 24,000 tons per day of twenty-four hours. At this rate of delivery, the markets of the Nova Scotia collieries should be well supplied before the season is over, that is, provided there is no cessation of employment through labor disputes or other causes.

**Two Collieries Re-opened.**—The coal industry of Nova Scotia is enjoying a season of prosperity, and all indications point to a greater spread of the trade. No. 7 Colliery, Sydney Mines, which was idle all winter, is again producing.

No. 15 Colliery had been closed down for several years, but was re-opened and repaired and is being put into condition to add to the Cape Breton output. This is one of four collieries, equipped for a daily output of 1,200 tons each. It will take some time to get the mine started, and the maximum output will be reached only in the course of a year or so. However, this mine will give employment to close on 500 men, and will make New Waterford a prosperous town.

**New Colliery on Lingan Seam.**—In this same district a new mine will be shortly opened up. Whether the location will be near one of the old mines or nearer Sydney Harbour, is not yet known. At any rate, it has been decided to open up the Lingan seam in some part of the New Waterford district, and it matters little what part so long as the seam is developed.

**Gardiner Seam to be Worked at No. 1 Colliery.**—No. 1 Colliery, one of the most profitable the Dominion Coal Company ever operated, is to be sunk to the Gardiner seam. This seam is five feet thick, and has a hard sandstone roof. The coal is clean, and of good quality, and miners, who many years ago worked it in what is known as the Gardiner Mine, say it is an ideal seam for longwall. This is yet to be proved, for no attempt was made in the early days to try out this system. Hard roof is not always the best in working the longwall system. A soapstone roof, which is tender, has often been found far more suitable than one that is too strong.

**Coal Mining Machines Under Test.**—The Dominion Coal Company are making a thorough test of coal-mining machines, and are using different machines in different collieries. The latest machine, now being tried out, is the Sullivan chain machine, electrically operated. It is giving splendid satisfaction. Two new Mavor Coulson mining machines have just arrived from Britain, and are also to be tried out. The Goodman mining machine from the United States is also among the importations, and will be tested shortly.

With the longwall method of mining in operation in one colliery, where the conveyor for loading coal is used, some progress has been made towards the European methods of mining. When the many different types of coal-cutting machines now on the ground are put into operation, the knowledge gained will be most helpful, and before long the machines most suitable to each particular seam will be in use there.

**Wages of Steel Workers.**—Sydney steel workers have been pressing their case for higher wage rates for some time, and they are still insistent that their request be granted. This time, however, they have acted with more wisdom, and are satisfied to let their claims go before the meeting of the Directors, which is to be held shortly. A policy of this sort appeals to reasonable men, and is much more likely to be successful than when mob tactics are used and threats of dire destruction are made. It is hoped that the Company will be able to meet the demands of the workmen sufficiently to show them that they are ready to do what they can to help them, when their case is presented in a sane manner. The cost of living in Sydney is high, and there is much sympathy with the working classes; but at the same time, workmen who take unfair methods of enforcing their demands lose both the sympathy and support of the public, and it is in the interest of all working men to have the good wishes of all classes of the population.

### BRITISH COLUMBIA

**Bush Mines to be Re-opened.** — The Forty-Nine and Bush mines, Salmon River, Portland Canal, are reported to have been acquired by English interests with the result that work will be resumed on the Bush. G. L. Thompson has been examining the Forty-Nine. He was for a time connected with the Hirst-Chichagof Mine on Chichagof Island.

**Gold Prospects in Omineca.** — The Peace River Mining and Milling Co., has under development a large group of free milling low grade gold properties situated on Mount Selwyn, about three miles below the junction of the Parsnip and Findlay rivers in the Omineca district. Systematic sampling of the exposures took place last season and this year machinery and supplies are to be taken in to permit the carrying on of development. It is understood that the company proposes to test 200 tons of the ore, and, if this is satisfactory, preparations will be made for large-scale operations.

**Cariboo.** — J. D. Galloway, resident mining engineer for the northeastern part of British Columbia has returned from the Cedar Creek district of the Cariboo. He says that gold is being shipped by several operators, and that new and promising placer ground has been staked a few miles from the Cedar Creek discovery. The Murray-McGregor Mining Co. has been organized to take over the discovery claims in the field lately found. James Murray is reported to have recovered on May 8th last a seven and one-half ounce nugget, while the yield, by means of rockers, has been as high as \$50 a day. The installation of modern equipment is proposed.

**Kaslo.** — The Rambler-Cariboo Mines, situated near Kaslo, is expected to resume work shortly. A. F. McClaine is the managing director.

**Ainsworth.**—The Lake Shore Mining Co. Ltd., E. J. Edwards, manager, Ainsworth district, held their annual meeting recently, officers being elected as follows: President, T. A. Preston, Spokane; vice-president, Dr. H. H. Keeler, Spokane; secretary, Walter E. Hogan; treasurer, Geo. E. Stout, Spokane; managing director, E. J. Edwards; directors, L. P. Turner, Spokane; Ed. Bates, Worcester, Mass.; and John C. Calvert, Pawtucket, R. I. The annual report showed that a 750-foot tunnel had been driven and cross cuts, although 60 feet in ore, have not yet reached the hanging wall. The results are considered satisfactory and a meeting is to be held at Spokane to consider the driving of a lower tunnel at the lake level and the installation of a mill of 150 ton daily capacity.

**Trail Ore Receipts.** — During the last ten days of the month of May, 11,386 tons of ore were received at the Trail Smelter. The Lightning Peak Mine, Arrow Lakes district, sent a small shipment and the Sidney Leasing Co., Idaho, contributed 58 tons. The details follow:

| Mine                                      | Tonnage |
|-------------------------------------------|---------|
| Alamo, Alamo . . . . .                    | 52      |
| Bell, Beaverdell . . . . .                | 36      |
| Company Mines . . . . .                   | 10,135  |
| Henderson Group, Smithers . . . . .       | 21      |
| Knob Hill, Republic Wm. . . . .           | 161     |
| Lightning Peak, Edgewood . . . . .        | 3       |
| Lone Pine, Republic Wm. . . . .           | 385     |
| Molly Hughes, New Denver . . . . .        | 10      |
| Quilp, Republic Wm. . . . .               | 206     |
| Roseberry, Surprise, New Denver . . . . . | 43      |
| Sidney Leasing Co., Idaho . . . . .       | 58      |
| Silversmith, Sandon . . . . .             | 297     |

11,386

**New Shippers Expected.** — The Cork Province Mine Ainsworth, expects to be shipping in June. The Florence Silver Mining Co. Ltd., Ainsworth, which has uncovered new ore-bodies, is preparing for operations on a considerable scale. Eighty-six men now are employed and a twelve-mile power line is to be built from Queen's Bay to the property. This will connect with the extension being constructed by the city of Nelson and will eliminate the past power problems of the Company.

**Copper Concentrate from Tidewater Mill.** — The Tidewater Copper Co., Sidney Inlet, Vancouver Island, has overcome power difficulties, caused by intermittent water shortage, by the installation of a 300 h.p. Diesel engine. Two hundred tons of ore are being mined per day, from which there is a recovery of some 12,000 lbs. copper together with some gold and silver. At twenty-day intervals the Company ships 4,000 tons of concentrate to the Tacoma smelter.

**Field Work in Northern, B C.** — Dr. George Hanson, Canadian Geological Survey, will spend the summer season in the field at Kitsungalum Valley and the northern British Columbia region from the town of Terrace to Alice Arm. He will map the Coast Range batholith in the area, will investigate the coal and mineral resources generally, and will give special attention to the reported arsenic deposits of the Hazelton District.

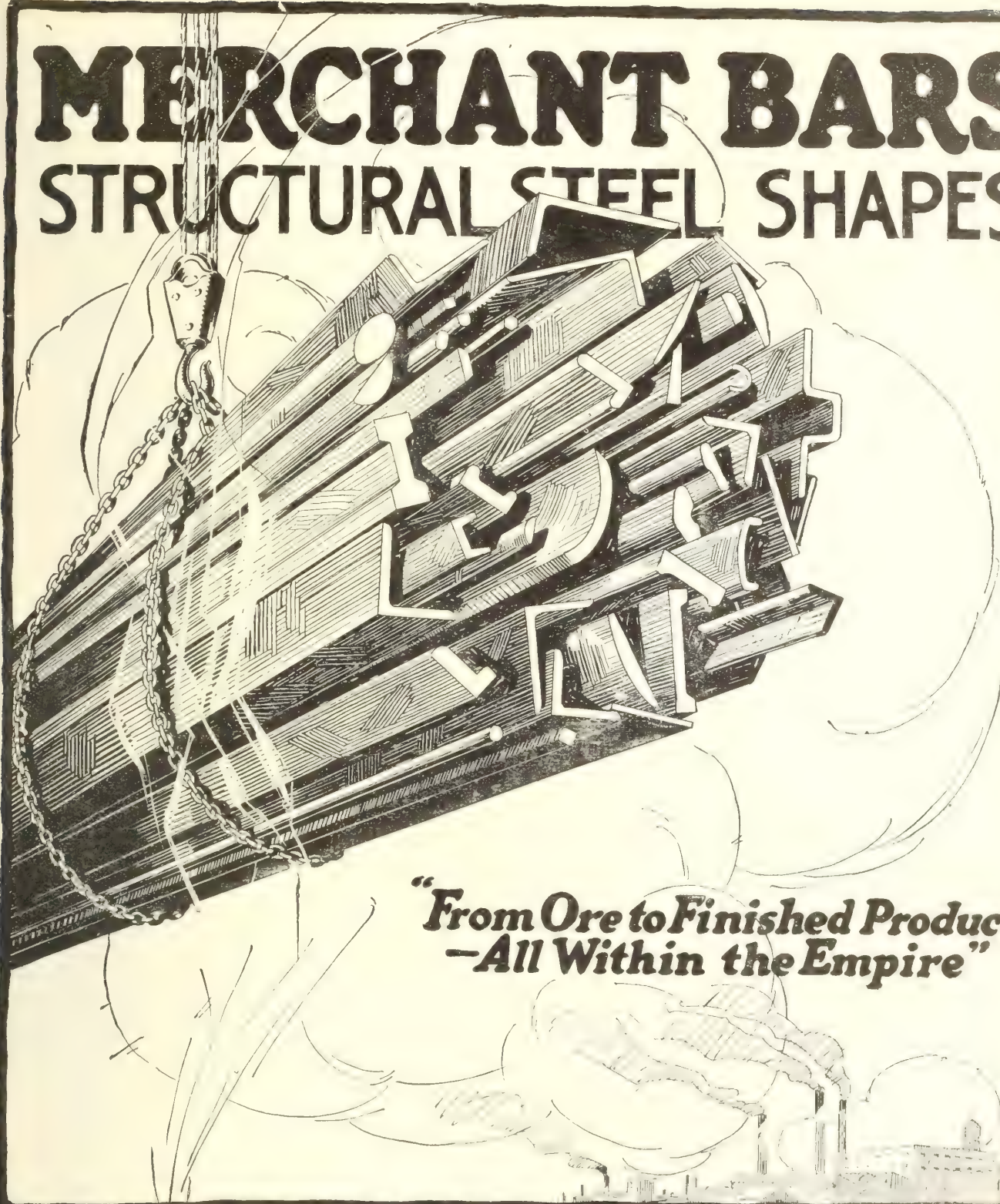
**Geological Survey of Hong Kong Island.** — Dean R. W. Brock, of the University of British Columbia, announces that the Geological Department of the Uni-



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#### Recent Publications

- Phosphate in Canada, by H. S. Spence.  
The Preparation, Transportation and Combustion of Powder, by JOHN BLIZARD.
- Road Materials along the St. Lawrence River, from Quebec Boundary to Cardinal, Ont., by R. H. Picher.
- Building and Ornamental Stones of Canada (British Columbia.) Vol. V., by W. A. Parks, Ph. D.
- Barium and Strontium in Canada, by H. S. Spence.  
The Coalfields and Coal Industry of Eastern Canada, by F. W. Gray.
- The Value of Peat Fuel for the Generation of Steam, by J. Blizard, B. Sc.
- Analyses of Canadian Fuels. Parts I to V, by E. Stansfield M. Sc., and J. H. H. Nicolls, M. Sc.
- Graphite by H. S. Spence.
- Gas Producer Trials with Alberta Coals, by J. Blizard and E. S. Malloch.
- Summary Report of the Mines Branch, 1920.  
The Mines Branch maintains the following laboratories in which investigations are made with a view to assisting in the development of the general mining industry of Canada:
- Fuel Testing Laboratory.**—Testing value of Canadian fuels for steam raising and production of power gas; analyses, and other chemical and physical examinations of solid, liquid and gaseous fuels are also made.
- Ore-Dressing Laboratory.**—Testing of Canadian ores and minerals, to ascertain most economical methods of treatment.
- Chemical Laboratory.**—Analysing and assaying of all mineral substances and their manufactured products. Copies of schedules of fees, which are slightly in excess of those charged by private practitioners, may be had on application.
- Ceramic Laboratory.**—Equipment is such that complete physical tests on clays and shales of the Dominion can be made, to determine their value from an economic standpoint.
- Structural Materials Laboratory.**—Experimental work on sands, cements and limes is also undertaken.
- Applications for reports and particulars relative to having investigations made in the several laboratories** should be addressed to **The Director, Mines Branch, Department of Mines, Ottawa.**
- Summary Report.** The annual Summary Report of the Geological Survey is now printed in parts. Applicants should, therefore, state what particular geologist's report is required, or what subject they are interested in.
- Memoir 108. The Mackenzie River Basin, by Charles Camsell and Wyatt Malcolm.

### GEOLOGICAL SURVEY

#### Recent Publications

- Memoir 119. The Reed-Wekusko Map-Area, Northern Manitoba, by F. J. Alcock.
- Memoir 121. The Malagash Salt Deposit, Cumberland County, N. S., by A. O. Hayes.
- Memoir 123. Sixty-mile and Ladue Rivers Area, Yukon, by W. E. Cockfield.
- Memoir 125. Sedimentation of the Fraser River delta, by W. A. Johnston.
- Memoir 127. Beauceville map-area, Quebec, by B. R. MacKay.
- Memoir 128. Winnipegosis and Upper Whitemouth River areas, Manitoba, Pleistocene and Recent deposits, by W. A. Johnston.
- Memoir 130. Geology and mineral deposits of the Bridge River map-area, British Columbia, by W. S. McCann.
- Memoir 131. Kenogami, Round and Larder Lake areas, Timiskaming district, Ontario, by H. C. Cooke.
- Map 1585. Mackenzie River basin, 1922 edition. Geology.
- Map 1751. Wainwright, Alberta. Topography.
- Map 1752. Monitor, Alberta and Saskatchewan. Topography.
- Map 1754. Upper Elk and Highwood rivers, British Columbia and Alberta. Topography.
- Map 1829. Salmon River area, Portland Canal mining division, B. C. Geology.
- Map 1831. Vegreville; townships 47 to 55, ranges 11 to 16 west of the 4th meridian, Alberta. Topography.
- Map 1835. Beauceville, Beauce county, Quebec. Geology.
- Map 1836. Explored routes in a belt traversed by the Canadian National Railways between Longlac and Nipigon, Ontario. Geology.
- Map 1860. Keno Hill area, Mayo district, Yukon. Geology.
- Map 1882. Bridge River, B. C. Geology.
- Map 1901. Upper Kitzault valley, B. C. Geology.
- Map 1948. Wanapitei Lake area, Ont. Geology.
- Applicants for publications not listed above should mention the precise area concerning which information is desired.
- The Geological Survey will, under certain limitations, give information and advice upon subjects relating to general and economic geology. Mineral and rock specimens, when accompanied by definite statements of localities, will be examined and their nature reported upon.
- Communications should be addressed to **The Director, Geological Survey, Ottawa.**

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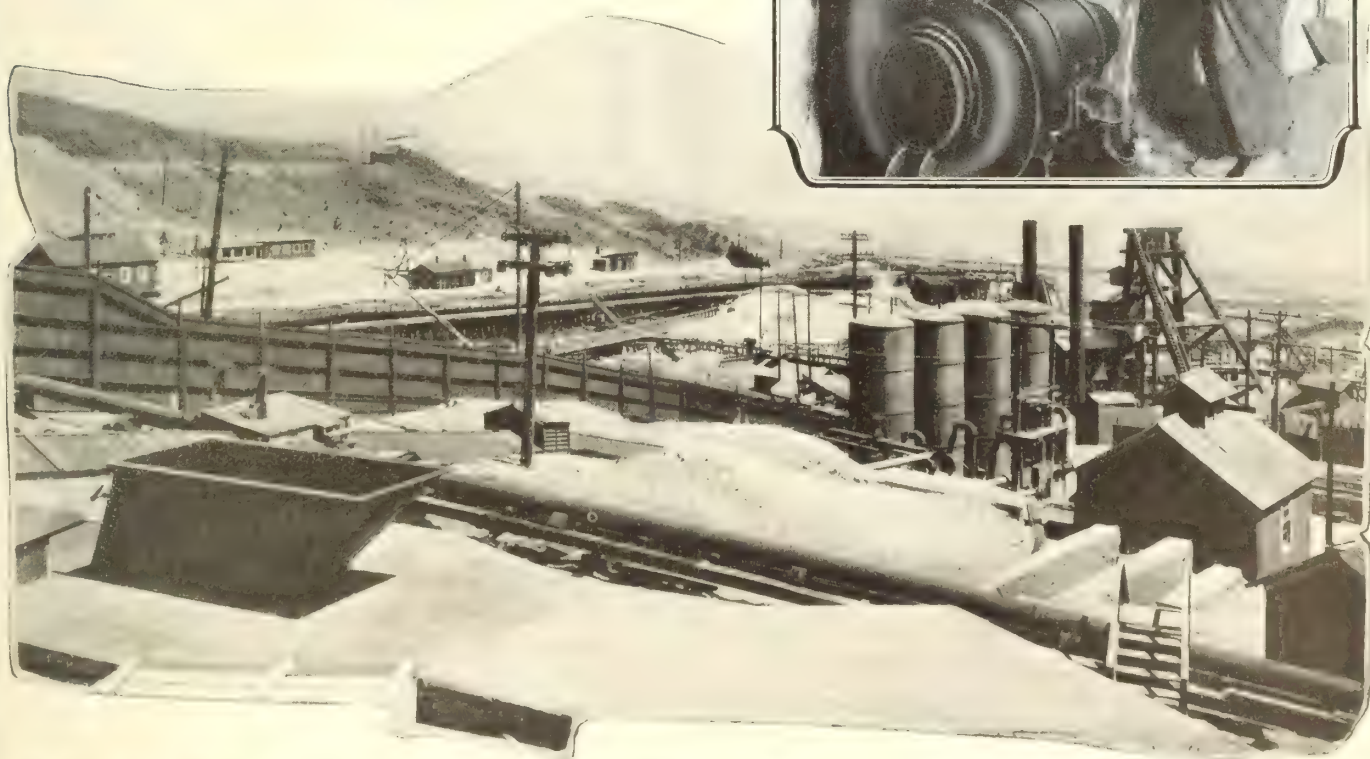
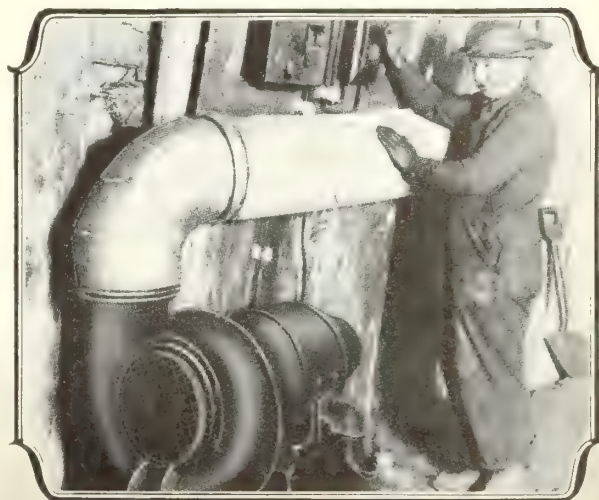
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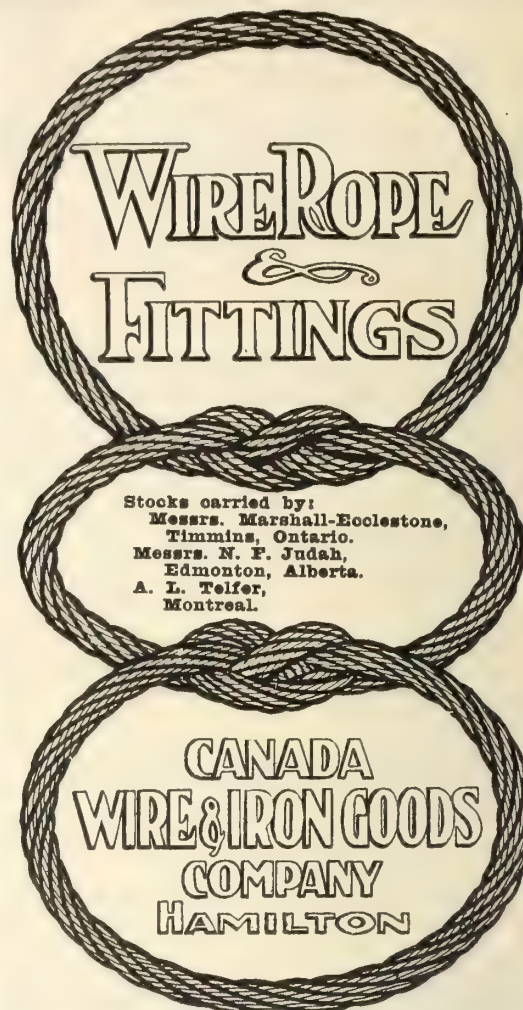
#### INTELLIGENCE SERVICE

The department has a wide range of information on Canada's Natural Resources available to the public and invites enquiries of all kinds: Minerals, Forest Products, Agricultural Opportunities, Waterpowers.

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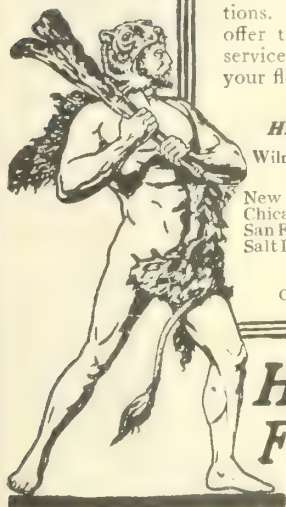
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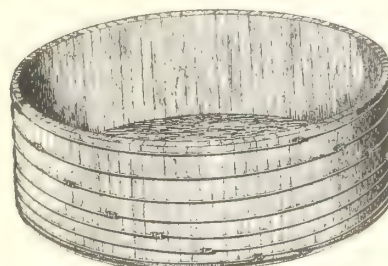
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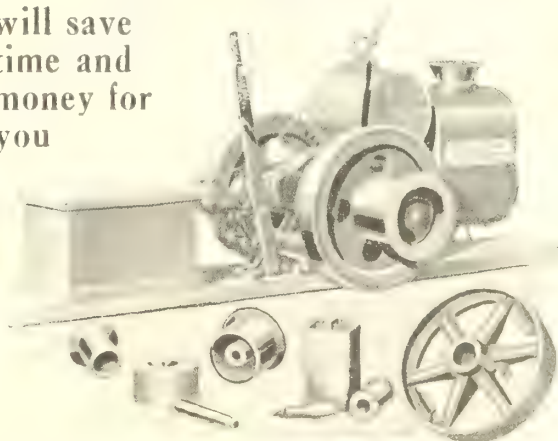
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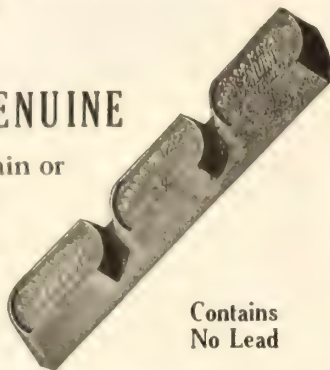
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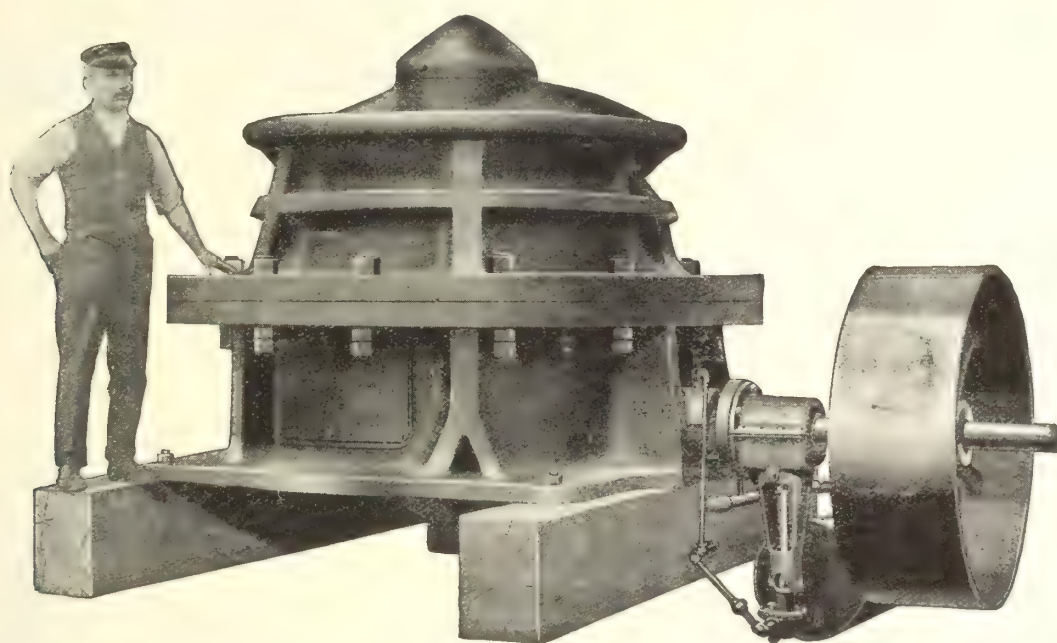
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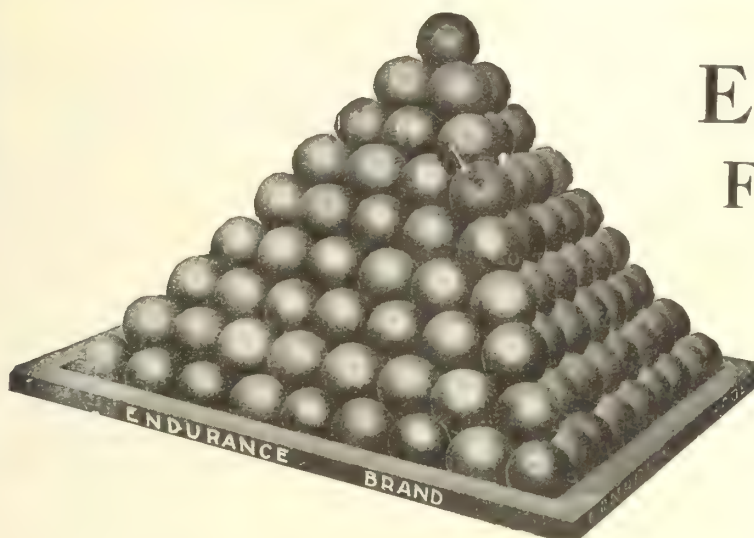
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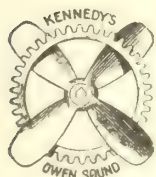
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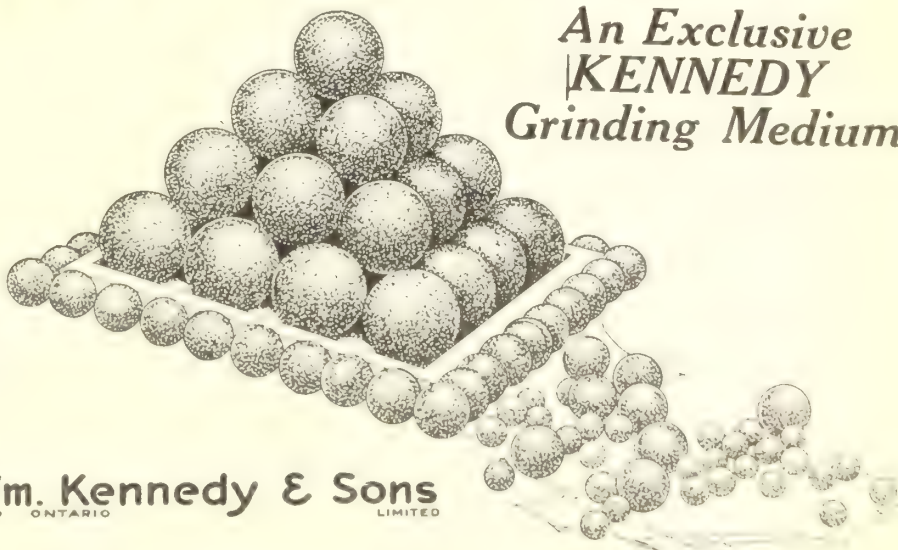
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# Ontario's



# Minerals

PROVINCE OF ONTARIO

DEPARTMENT OF MINES

Hon. H. MILLS, Minister of Mines

## Mineral Areas.

Ontario, with its 407,262 square miles, contains many millions of acres in which the geological formations are favorable for the occurrence of minerals, 70 per cent of the area being underlain by rocks of pre-Cambrian age. The phenomenally rich silver mines of Cobalt occur in these rocks; so also do the far-famed nickel-copper deposits of Sudbury, the gold of Porcupine and Kirkland Lake, and the iron ore of Magpie and Moose Mountain mines.

## Economic Minerals.

In addition to the above, practically all economic minerals (coal and tin excepted) are found in Ontario:—actinolite, apatite, arsenic, asbestos, cobalt, corundum, feldspar, fluor-spar, graphite, gypsum, iron pyrites, lead, mica, molybdenite, natural gas, palladium, petroleum, platinum, quartz, salt, talc and zinc. This Province has the largest deposits on the continent of talc, feldspar, mica and graphite.

Building materials, such as ornamental marble, limestone, sandstone, granite, trap, sand and gravel, lime, Portland cement, brick and tile, meet every demand.

## Mineral Production.

Preliminary returns show the output of the mines and metallurgical works of the Province for the year 1921 to be worth \$48,128,387, of which the metallic production was \$27,574,202.

The following figures show the rapid growth of Ontario's mineral industry by five-year periods since 1891:

| Year.          | Value.      | Year.          | Value.       |
|----------------|-------------|----------------|--------------|
| 1891 . . . . . | \$4,705,672 | 1906 . . . . . | \$22,388,383 |
| 1896 . . . . . | 5,235,003   | 1911 . . . . . | 41,976,797   |
| 1901 . . . . . | 11,831,086  | 1916 . . . . . | 65,303,822   |

## Dividends.

Dividends and bonuses paid to the end of 1921 amounted to \$23,140,734 for gold mining companies, and \$84,388,185 for silver mining companies or a total of \$107,528,919.

## Mining Regulations.

A miner's license costs \$5.00 per annum, and entitles the holder to stake out in any or every mining division three claims of 40 acres each. After performing 200 days' assessment work on a claim, patent may be obtained from the Crown on payment of \$2.50 or \$3.00 per acre, depending on location in unsurveyed or surveyed territory.

## Assay Office.

The Provincial Assay Office at No. 5 Queen's Park, Toronto, is maintained by the Department of Mines for the free identification of minerals, free assays under the provisions of the Mining Act of Ontario, and also for general assay work as per the Schedule of Charges which may be obtained on application.

## Temiskaming Testing Laboratories

The Department maintains, at Cobalt, an ore sampling and testing laboratory which is now prepared to receive parcels of gold ore from 100 pounds upward, and after sampling and assaying the same to pay to the shipper the value thereof, less treatment charges. The purpose is to afford a market for ores extracted by prospectors and others in developing their mining claims, enabling them to obtain funds which they can use for further work and to report on the most satisfactory method of treatment. Fuller information may be obtained on application to the Manager, Temiskaming Testing Laboratories, Cobalt, Ontario.

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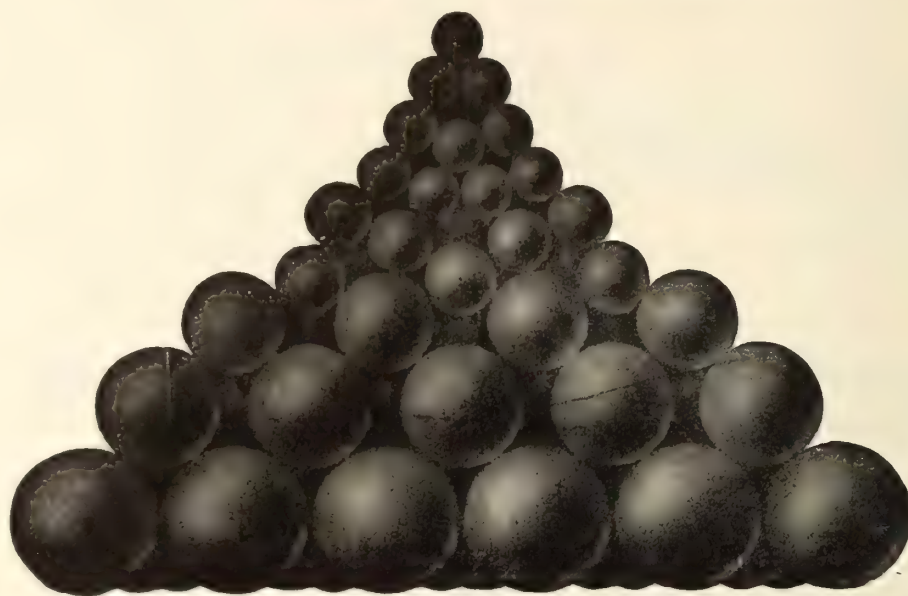
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PUBLISHED WEEKLY

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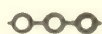
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# :-: EDITORIAL :-:

## THE ECONOMIC CONFERENCE IN LONDON

Premier Mackenzie King stated last Friday, in answer to a question in the House of Commons, that an opportunity will be given to discuss the Imperial Conference and the Economic Conference to be held in London next autumn when the Supplementary Estimates are brought down. It is expected that this will be during the present week.

The Economic Conference in London has special significance for Canadians not only because our country is, outside of Britain herself, the most important part of the Empire, but for another reason. The Conference will be concerned principally with mineral resources, and Canada is the Empire's treasure-house of minerals. The attention of the Conference will be focussed on the mines, present and prospective, of this land.

Preparations are already well under way to ensure that the Canadian mineral industry shall be well represented on this important occasion. Certain of the technical officers of the Department of Mines in Ottawa have been instructed to prepare a brief, not only to cover Canada's proved and potential mineral resources in their relation to her own and the Empire's needs, but also to indicate the cases where this country must import mineral products, with a view to securing these from within the Empire.

The Federal Department of Mines has on its technical staff men well qualified to deal adequately with each and all of the mineral resources that will come up for discussion. That the Geological Survey and the Mines Branch are thus prepared to deal thoroughly and promptly with any of the wide range of minerals is due in large measure to the policy of having a specialist for each important group of minerals. Our country and its mineral industry have now, in some measure, passed through the stage of geological reconnaissance, and are entering on a second stage, where the services of the economic geologist and the mineral technologist are required to aid and direct commercial development. The Department of Mines has progressed along with the industry it is designed to serve. The Economic Conference marks a distinct phase in the progress of mining in Canada, and on this occasion our Federal Department of Mines has assumed, of its own initiative, a position of leadership that is its duty as well as its right.

The thorough preparations now under way for the Economic Conference will, no doubt, be followed in due course by equally adequate provision of personnel

round the council board. Canada will, of course, be represented by a Minister of the Crown. This Minister will have little or no personal knowledge of our mineral industry. It will, therefore, be necessary to have at the Conference, in an advisory capacity, one or more technical officers of the Department of Mines who will have all the required information at their command. Documentary evidence is seldom sufficient in such a case. The importance of the occasion demands that the best qualified members of the staff available be appointed to this duty. Only thus can we be sure that Canada will reap the full benefit from what promises to be a momentous conference.

## JOURNALISTS WILL AID MUTUAL UNDERSTANDING

Last week a party of three hundred journalists visited the collieries and steel plants at Sydney, Nova Scotia. Our correspondent for Nova Scotia, who accompanied the excursionists, gives today his impressions of the tour. His opinion, as well as that of many others, is that the first-hand information thus gained by this large group of journalists will have a decidedly beneficial result. The larger part of the people of Canada understand little either of conditions or of events in our most easterly province. The impression one gets from the regular press reports is that the mining areas are seething with disaffection and discontent. The cloud of smoke betokens fire, to be sure; but it is merely smoldering, and is kept alive only by the strenuous fanning of a small group of malcontents, influenced by an extreme form of socialistic belief.

The importance of Nova Scotia to Canada as a whole is described clearly and forcefully by Mr. F. W. Gray in an address before the visiting journalists, which we reproduce on another page. Mr. Gray is not prone to exaggeration, and we can take to heart the conclusion that without the coal of Nova Scotia, Canada could not long retain her present measure of economic independence. On this account, as well as for various other reasons, it behooves the residents of the central and western provinces to gain and retain a better understanding of the little province in the Atlantic and its inhabitants, as it is likewise the duty of the "Blue-nose" to reciprocate this interest. The personal knowledge of the three hundred visiting journalists from end to end of Canada, gained last week, will do much toward cultivating mutual understanding and toward strengthening the bonds that hold Nova Scotia within the Confederation.



### WHERE ECONOMY MIGHT BEGIN

We are frequently told, and with undeniable truth, that one of our prime duties, both nationally and individually, is to practise economy. There are two ways to make our national budget balance. One is by the imposition of additional taxation. The other is by retrenchment in expenditure. The first means an additional burden on industry which is now, after a long period of depression, picking up. Accordingly, recourse should not be had to this method, if it can possibly be avoided. Therefore we need must practise economy, the chief of the homespun virtues. We gladly acknowledge that the Dominion Government has made some attempt to set some little example in this direction, although we may remark incidentally, that the force of that example has apparently been lost on the Provincial Governments. But there is one most suitable field for the practice of retrenchment which is white already to harvest and which has been left practically untouched. We refer, of course, to the Civil Service at Ottawa—it needs no conjuror to guess that!

The whole world views with admiration Great Britain's accomplishments in budget improvement during the four years that have elapsed since the Armistice. She regained practically a balanced budget within two years after the war. Seeing that her revenue has decreased by about one third since the first peace year, due in part to lowering of taxation, how did she achieve this feat? The answer to this question is to be found in the fact that she managed to halve her expenditure. This is a very striking accomplishment and one which we in this land of unbalanced budgets may well view with envy no less than with admiration. During the post-war period Great Britain, naturally enough, made some very outstanding reductions in her expenditures for defence services. But not less striking were the reductions she contrived to effect in her expenditures for civil departments. During the past year alone \$275,000,000 was lopped off the civil expenditures, and further large economies of the same nature are being undertaken for the current fiscal year.

In France it has been much the same. During the past year the French Government cut down its staff about fifty thousand. It is true the French have not equalled the success of the British as regards attaining a balanced budget. But both countries realize that economy must begin at home—in the Civil Service. It is notorious that, at Ottawa, the Civil Service is very much over-staffed. It may be that, during the war, more civil servants were engaged at Ottawa than the requirements of the federal service warranted. It may be, on the other hand, that the increase was justified. But at any rate it is clearly the duty of the Government today, when economy in public expenditures is so imperative a necessity, to reduce the staffs as much as possible.

We do not say that the task is a pleasant or an easy one. It is the way of civil servants, in more countries than one, to block reforms that aim at putting their service on a more economical and efficient basis. Moreover, nothing is easier than to make a seemingly good case for expenditures that are really unnecessary. Heads of departments and of branches of departments have, many of them, rather a *penchant* for large staffs, the idea seemingly being that the larger the staff the more valuable and important the man at the head of it. But if the Government does its duty, it will disregard all such considerations as these, and will suppress all positions that are not demanded by the strict requirements of necessity. That is the line that our big industrial establishments took as soon as the "boom" for which the war was responsible had subsided. The Government, in the public interests, should not be more backward in using the pruning-knife than industrial concerns are in their own interests.

In coming to this conclusion, we must, however, note an exception to the rule. The Department of Mines serves the largest industry in Canada, next to agriculture. Though the progress of the mineral industry depends in notable degree upon the activities of this department, it is one of the smallest in Ottawa. Its staff is now smaller than in pre-war years. It is well administered and economically managed, and we would judge that in its case the only hope for economy is more adequate inter-departmental coöperation along certain lines. The staff of the Department of Mines is notable for faithful service. It cannot and must not be pruned. On the other hand, as soon as we can afford it, its appropriation must be substantially increased.

### A PICTURE OF KEEWATIN TIMES

Dr. H. C. Cooke's report on the Opasatika map-area, adjoining Rouyn township and including the western part of the gold belt of northwestern Quebec now being actively prospected, is published, in part, in the 1922 report of *Mining Operations in the Province of Quebec*, distributed last week. This report will be read by thousands of those interested in the new gold field, and will be studied by hundreds of mining men and prospectors engaged in its development, all of whom will form their own conclusions about it. We consider it an excellent piece of work, containing data precisely stated and clean-cut conclusions.

We wish to draw attention to another aspect of this report that might otherwise escape the reader's attention. It is written in good English; not only that, but it has a style that is rare, and that is more nearly characteristic of polished writers in Britain than it is of the half-formed attempts that are the rule among men of science on this continent.

It is to illustrate this point that we print on another

page Dr. Cooke's "historical summary". It is a word picture that brings before one's mental vision a vivid reproduction of the events of Keewatin times. Such a summary has been made a part of all the geological reports of the Survey during recent years, as has been remarked before in these columns. The historical summary now constitutes one of the most interesting, as well as most useful, parts of the reports. The Director of the Geological Survey and his staff are to be congratulated on the success they have attained already in their effort to make the Survey's reports readable, as well as authoritative and dependable.

### "A CAUTIOUS BOOM"

Business conditions in the United States are always of interest and importance to Canadians. For, in the matter of post-war booms and depressions, this country has, so far, followed, at a certain distance of time, and in less pronounced fashion, in the footsteps of the United States. In that country, a sensational burst of prosperity has been in evidence. This has resulted in very formidable wage demands being made there. And such demands we, in this country, can scarcely view with indifference; for, apart from the marked tendency in Canada, of which we have just made mention, to follow in the footsteps of the United States in such matters, the questions of wages and employment in Canada are very greatly and directly influenced by labor conditions in the land to the south of us.

Many acute observers of industrial conditions in the United States have expressed the opinion that the sudden increase in wages that has taken place will tend to increase operating costs, and ultimately the price of consumers' goods, to figures that will militate against the best interests of labor and offer a serious set-back to the general prosperity that has already begun. Naturally we have taken note of such expressions of opinion with concern; for we are not unmindful of the possibility that if there is in this country, following in the wake of the United States, a too great and too rapid increase of industrial costs, a buyers' strike may ensue. We do not want to see prosperity checked by undue inflation, and, if this is to be averted, prices must be stabilized and wages kept on a reasonable basis. Accordingly, we are glad to see in the *Business Bulletin* for May, issued by the Cleveland Trust Company, that the boom in the United States is now being tempered with common sense: "What has happened is that the era of prosperity has developed into a cautious boom", says the bank. "It is certain that the present record breaking industrial activity cannot continue indefinitely. Production is running well ahead of normal consumption. War and depression shortages are being rapidly made up, and there is no large export demand to consume excess output of manufactured goods. If the recently developed mood of cautious buying continues there will be no great price inflation, and no speculative industrial ex-

pansion such as characterized the boom of 1919 and 1920. It would be reassuring to believe that under these conditions prosperity could be conserved, at least for a long period, but probably that would not be the outcome. What might happen under those conditions is that the succeeding decline would be much less drastic than would be the case if expansion and price increases were unrestrained."

In Canada we have not yet experienced the marked business prosperity which in the United States—in some industries, at any rate — has been in evidence for two years now. But it is coming our way. And, in order that we may handle it to the best advantage, it is necessary that the boom, when it comes, should be "a cautious boom." So will it last the longer.

### THE FOREST FIRES

The newspapers are full of the subject of forest fires these days. At last the public seem to have become conscious of the fact that more millions worth of valuable timber and pulpwood are destroyed each year than would serve to balance the national budget, with plenty over for contingencies. Various means have been adopted to reduce the number of fires, but still the fires are numberless. The blame for the vast majority of these fires is now being placed where it belongs — at the door of the settler who must burn his slash in order to clear the land, and of the lumberman whose operations leave a cut-over area in such a state that a conflagration is almost inevitable. Unlike the steam locomotive, which burns its path through the forest once and for all, these first two agents of destruction and of civilization advance continuously into the forest areas. Until there is some radical change in the administration of our wooded public lands, individual carelessness is bound to result in wholesale disaster. The present attempts at reform are mere palliatives. Until policies are adopted that make each settler, lumberman, prospector or fisherman entering the woods personally responsible for the prevention of fires, we shall continue to suffer this appalling loss.

### TO THE MOSQUITO

*(Genuine apologies to Barbauld)*

Fly! I know not why thou art—  
But know that thou and I must part:  
And why on earth we ever met,  
I own to me's a secret yet.

Fly! we've been too long together,  
Through pleasant and through cloudy weather.  
Tis time to part, my duty's clear,  
I'll have to swat thee now, I fear;  
For God's sake, go! I give thee warning.  
Don't choose thy time:  
Bid me GOOD NIGHT,—and in some other clime  
Buzz thy GOOD MORNING

J. C. M.



# The Story of the Rocks in Northwestern Quebec

(Continued from H. C. COOKES' report on Opasatika Area.)

A brief historical summary of events up to this point may help to create a clear picture in the mind of the reader. The period described commences with the outpouring of the great floods of lava and their accompanying beds of tuff that now form the Keewatin. How long this period may have been, there is no means of knowing. The great thicknesses of lava, over 4 miles on Lac Seul lake, with neither bottom nor top exposed, undoubtedly required a great length of time to accumulate, but flow must have followed flow with considerable rapidity, geologically speaking, for there is rarely found between flows any weathered material, or old soil, such as would be rapidly formed had the lavas been poured out on land and left uncovered for any length of time; or any normal bedded sediments such as might be expected had the flows been poured out beneath the sea and not been covered with more lava within a few years. The Keewatin may be confidently assumed, therefore, to have been a period of almost constant extrusion, in this area at least, with an average of at least one great flow per century. The presence of beautifully bedded tuffs at the top of the series, in Rouyn township, the occasional occurrence of thinly bedded cherts between flows, and the almost universal occurrence of pillow structures in the lavas, all point to the conclusion that the extrusions were submarine, at any rate in Quebec and adjacent parts of Ontario—so that the area was covered by the sea or by some other large body of water.

After the period of extrusion ended, the lavas were raised above sea-level by mountain-building movements, and gently folded. Apparently a range of mountains, probably rather low, was formed to the north of the present Timiskaming area. Almost certainly some batholiths of granite must have been intruded into the lavas at the time of the folding, because a few pebbles of coarse granite are found in the overlying Timiskaming conglomerate.

As soon as uplift brought the rocks above sea-level, they began to be worn away by rain, running water, and the other agencies of erosion. Erosion was undoubtedly rapid, not only because of the rugged nature of the country, but also because of the lack of vegetation in that early time. The mat of roots that now covers the earth's surface wherever climatic conditions permit, and which effectively prevents running water from carrying away any large proportion of soil, was then entirely absent; and consequently every rain storm must have swept great quantities of mud, sand, and gravel into streams, to be carried to the sea. The land at that time must have been a scene of unimaginable desolation; black lava everywhere, carved no doubt by the weather into cliffs, spires, and an infinite variety of weird shapes; with the gloomy tints of basalts relieved here and there, it is true, by the lighter colours of rhyolite or dacite, but without a trace of the soft green of vegetation; with the surface everywhere piled high with blocks, boulders, and masses of rock, from between which almost every particle of soil had been swept by running water. From

the mountains rushed torrential streams, black with lava mud, and rolling quantities of gravel and boulders along their beds to the plains below.

Such were the conditions that prevailed after the uplift of the Keewatin lavas, when the deposition of the Timiskaming series commenced. The great conglomerates at the base of the series appear to have been huge, flat, fan-shaped deposits, laid down at the foot of the mountains at the mouths of outrushing streams. When the streams passed from the steep slopes of the mountains to the flat slopes of the plains, their velocity was checked, and consequently they had to drop a great part of the load they carried—naturally, the coarsest material. Their bed thus filled up, the streams were forced to break out, first in one place, then another, depositing wherever they went, until long and broad lenses of gravel of great thickness were formed.

The next event is more obscure. Perhaps great lakes were formed in some way. Perhaps the deposition of the great weights of gravel caused the land to sink locally below sea-level. In one way or the other the area where the gravels were laid down became covered with a rather shallow body of water, in which deposition took place, not of gravel, but of sands. As thousands of feet of sand were deposited, the second hypothesis is probably the correct one, and sinking of the sea-bottom kept pace, approximately, with deposition. Had the areas been lakes, they would have been filled up quickly. Here and there an occasional volcano smoked, contributing the lavas that now form local members of the Timiskaming series.

Then began the series of earth movements that uplifted the newly-formed Timiskaming series and folded them. They began with the intrusion, in small quantities, of igneous rocks, hornblende, lamprophyre, amphibolite, and diorite porphyry. These tended to form sill-like masses, rather than dykes, in the still flat-bedded sediments. Then came tremendous horizontal thrusts, so violent and long-continued that the Timiskaming strata and the underlying Keewatin lavas were turned on edge, and even overturned in places. The earth movements then gradually died away with the intrusion of various igneous rocks, gabbros of several types, granite, syenite porphyry and syenite, and the hornblende-mica lamprophyres. Most of these were small, relatively speaking, except the intrusion of the granite, which was vast and widespread. It welled up slowly in enormous masses that ate their way forward by breaking off blocks of the overlying rock, which sank in the liquid granite, or were dissolved by it. The thicknesses of rock thus stopped away by the granite are to be measured in miles, rather than in any lesser unit. In the southern part of Opasatika area, not only the 7,000 feet or more of Timiskaming series has been thus eaten away, but also all the immense underlying thicknesses of lavas, together with all the unknown floor on which the lavas were laid down.



## Electric Lamps in Cape Breton Collieries

Dominion Collieries Equipped with New Lamps and Lamp Houses

By JOHN MOFFATT

For a long time the miners of Cape Breton discussed the electric safety lamp as a possible substitute for the oil safety lamp in the collieries. Again and again representatives of the workmen and the coal operators met and talked the matter over. It was agreed by all that a lamp that could not be easily put out and that had a greater candle-power was most desirable. In searching for this lamp a number of coal operators and miners' delegates some years ago waited on Professor Sexton of the Halifax Technical School for the purpose of witnessing a demonstration of the electric lamp. The test was very simple, but just as conclusive as it was simple. Having made an explosive mixture, such as is met with in a coal mine, the Professor took a fairly large-sized electric lamp and placed it within the explosive mixture. The current was turned on and the bulb broken, when an explosion followed. A smaller lamp was next tried with the same result. This continued until a lamp of low voltage was placed in the mixture, and when the bulb was broken no explosion followed. Lamps of this low voltage were tried again and again, always with the same result. The mixed delegation of miners and operators went away feeling that the time would come when electric safety lamps would be used in the coal mines.

### 10,000 New Lamps

It was left, however, to American mine operators to put the electric lamp to a practical, every-day, working test. However, the eyes of the Nova Scotia miners were fixed on the electric safety lamp, and finally it was decided that the Edison electric safety lamp should be installed. The work of installation has now been completed at the Dominion collieries in Cape Breton, and in all 10,000 lamps have been put in to replace the Ackroid and Best oil safety lamp. The initial expenditure in remodelling the lamp houses to receive the new equipment, added to the cost of the lamps themselves, was large. However the men are well satisfied with the new lamp, and the Company feel that they have been repaid by the satisfaction of the workmen. There is now no long journey to a re-lighting station underground, for the electric lamps do not go out. The new lamp can be flashed on all parts of the workings at will, whereas the oil safety lamp could not be tilted to shine on the roof and floor without danger of putting it out or of breaking the glass. In short, there is no comparison between the oil safety and electric lamp in a coal mine. There are no shadows such as were cast by the bars of the oil lamp and all the light generated serves a useful purpose.

### Changing the Lamps

The inside walls of the remodelled lamp houses were constructed with a view to lamp delivery at the windows, and lamp charging while on the racks. Fastened to these walls are the discharging racks in which the batteries are charged, each rack accommodating 100 batteries or less and equipped with rheostats and ampere meters for regulating the charging current to one ampere, irrespective of the number of batteries being charged. For charging, where direct current is not available, or not the required voltage, a motor-generator set is installed. This consists of a 550-volt alternating current motor coupled to a 250-volt cur-

rent generator. A suitable switch board is used holding a starting and running switch, a battery and automatic switch, field rheostat, etc. An automatic switch disconnects the batteries from the generator, should the motor stop, thereby preventing the batteries from discharging. The field rheostat is used for regulating the generating current. This generator set is connected with the discharging rack by suitable charging wires.

Racks are provided for the purpose of storing the headpieces and batteries together in compartments numbered to correspond with the lamp number and miner's check. These checks are placed on the top of the charging racks, so that the actual number of men working can easily be ascertained. The checks are returned to the owners upon return of the lamp. When returned, the lamps are unlocked, headpieces are removed, and the batteries placed in charging racks, ready for charging at the normal rate of 1 ampere current for a period of eight hours.

The headpiece, after being removed from the battery, is cleaned and all necessary repairs made, then returned to the storage rack, ready for delivery next day.

Some of the lamp houses are equipped with an electrically operated water still to provide the pure water required in the lamp batteries. This water tends to evaporate from the cells during charging. The chemicals used in the batteries are examined and replenished where necessary each week.

### Using the Lamps

The average light of the battery is twelve hours, although some last twice that length of time. The solution used is caustic potash, and as it is injurious to the hands it must be handled with care. Lamps, if handled properly, will give good service, but if tampered with or roughly handled, are easily broken. Considerable trouble was experienced at the beginning with loose bulbs and also bulbs irregular in size. The use of imperfect bulbs causes flickering, which adds to the breakage both of lamps and of bulbs. When flickering occurs, the miners are inclined to tap the lamps, and this breaks the filament.

Sometimes it happens that new batteries when first filled seem to be "dead." This gives a considerable amount of trouble to lamp men without experience; but the more experienced workman knows that air carbonises the solution and reduces its strength, and when the solution takes on a black color it is thrown out.

It was generally thought that when electric safety lamps were introduced into the mines nystagmus, a disease of the eye common among miners, would disappear. This is not the case, and the miner suffering from this condition of the eye, which at certain stages forces him to abandon his underground work, has not yet been relieved of his trouble.

It was also argued in favor of the electric lamp that its stronger light, and its place on the miners' pit cap would lessen the liability of accident. Reasonable as this argument seems, it has not been proven, up to the present time, that the accident rate has decreased.

### More Light in the Mine

Probably one of the most interesting sights to be seen at the colliery is the miners gathering at the lamp house



to receive the electric lamp on the morning when it is first given out. The men are up early, in anticipation of receiving the new lamps. Standing in a queue, they pass on as the lamps are given out. Before it is placed on the cap, the miner makes a general examination, and familiarizes himself with every part of his lamp. But it is when the mine is reached that the interest increases to its height. There is no fear of stumbling while walking, as there was with the oil safety lamp. The new lamp throws light on every part of the road, and places that have been passed unseen for years are now lighted up. The first day is one of real joy, and the miner experiences the feeling that "light is good, and pleasant unto the eyes to behold."

Examination for gas cannot be made with the electric safety lamp, and it follows that examiners must be provided with some other lamp. The Koehler is the lamp in common use by the examiners of the Dominion collieries. It is a standard safety lamp, and it is very reliable. Through every section of the mine, when it is working, examiners travel for the purpose of inspection, and under this condition, miners at the face are well protected.

### L. O. X. SAFE EXPLOSIVES

Liquid Oxygen Explosives are a fine example of the dependence of engineering and industry upon scientific research. They are a type of Sprengel explosive. The novel feature is that the oxidizing agent (liquid oxygen) and the combustible substance (carbonaceous matter alone or in combination with liquid hydrocarbons or even metallic powders, and, at times, inert absorbents) are brought together immediately before use. The components separately are non-explosive. Before L. O. X. could be seriously considered for commercial work, it was necessary to produce liquid oxygen economically in large quantity and to have satisfactory containers.

Liquefaction of so-called permanent gases, air, nitrogen, oxygen and others, long baffled those who attempted it, and yet required no unusual equipment once fundamental laws were known. Repeated endeavors to liquefy these gases by pressure alone, despite development of elaborate equipment for producing pressures up to 60,000 pounds per square inch, failed; one law had been overlooked, that all gases have not only a critical pressure, but also a critical temperature. Thomas Andrews, in 1869, was first to show that there is a temperature for every gas at and below which it can be liquefied and above which it cannot be liquefied by pressure; further, that when gases heretofore regarded as permanent were at their critical temperatures, they could be liquefied by comparatively moderate pressure. Louis Cailletet, in 1877, produced the first liquid air by allowing the pressure on previously compressed air to fall 4,500 pounds per square inch, thus lowering the temperature. In 1895, or somewhat earlier, Linde in Germany, Hampson in England and Tripler in America, demonstrated that liquid air could be produced upon a large scale. Later Claude found it more economical to cause the air to do work in expanding by passing it through an engine instead of expanding it through a nozzle.

Not until 1902 did Linde demonstrate that liquid air could be separated into its constituents by passing through a special still, similar in principle to that used for separating alcohol-water mixtures. This

rendered possible the production of liquid oxygen on a large scale. To-day it is practicable to produce it upon any scale desired, employing air pressures of 900 to 3,000 pounds per square inch. Liquid oxygen boils at — 182.93 degrees Centigrade; to be used without excessive evaporation loss, satisfactory storage and transport containers were necessary. Dulong and Petit were probably first to discover that passage of heat through glass by conduction could be greatly reduced by a vacuum wall; d'Arsonval, in 1887, was first to make practical use of glass walled vacuum containers, reducing evaporation loss to 1/10 that in plain glass; it was soon discovered that a vacuum did not prevent passage of radiant heat. Dewar, in 1892, found that silvering the inner walls of vacuum chambers of containers reduced evaporation loss 1/200 of a plain glass container's loss. These containers were admirable for laboratory use, but fragile. There was needed a metallic container with low evaporation loss. Dewar discovered that properly treated charcoal, at the temperature of liquid oxygen, had the property of absorbing large quantities of gases, including air, so perfectly as to produce a very high vacuum. He secured a British patent in 1904, and in 1906 pointed out that a high vacuum could be maintained between metallic walls by this means. Modern metallic containers for liquid oxygen are rugged, highly efficient devices.

These scientific developments and actual trial of L. O. X. had been made before the world war. When Germany was cut off and it became necessary to find a substitute for large quantities of explosives used for civilian purposes, incentive came for rapid development of these new explosives.

L. O. X. under certain conditions, have distinct advantages; substantial saving in cost, greater safety, freedom from noxious gases, no possibility of explosive in ore or waste rock, which may occasion trouble; elimination of danger from drilling into unexploded charges. In cities, where large quantities of explosives are used in excavating, there is ever present danger attendant upon transportation through the streets and risk of their falling into the hands of miscreants. These hazards can be eliminated through use of L. O. X. L. O. X. have certain disadvantages. They are not so convenient in inaccessible parts of a mine, nor have they been used successfully for shaft-sinking, or under water. Under no circumstances should they be used in gaseous or dusty coal mines. We may still look forward to important improvements through research in this interesting development of a valuable commercial use for one of the constituents of the air which surrounds us.

### GOLD VEINS AND PLACERS

Placer gold may often be followed back to its source in the rocks, and this sometimes leads to valuable discoveries. Small placers sometimes occur near gold veins, having been formed by recent weathering in a glaciated country. They should be looked upon as surface enrichments which have moved a short distance from their source and not likely to be of much extent or value. But there may be places where it would pay to work these recent placers in a small way.



# ON NIGHT SHIFT

By P. B. McDONALD

The other evening one of my students told me that he was to go to work at 11 p.m. for the Pennsylvania Railroad. When I suggested that this was "the graveyard shift," he remonstrated that it did not seem so to him because he liked working at that time of night. By the gleam in his eye I could see that he was sincere and meant what he said. To my mind there came memories of night shifts that I had spent in northern Michigan as timekeeper on a shaft-sinking job, and suddenly I could see his point of view. At that time I had objected to working nights, especially during the hot summer when sleeping in daylight was difficult. Yet I had enjoyed the experience.

On night shift one comes to work, fresh and energetic at an hour when the rest of the world is tired and ready for bed. As the men congregate, there is almost an air of conspiracy at such unusual activity in the evening; a rough sociability is evident to a greater extent than in day time. Later, during the long watches of the night, the feeling of the unusual increases as the realization comes that the rest of the world is asleep, and that only a few necessary workers are awake and alert, guarding and attending to the affairs of civilization.

During the hours between midnight and daybreak the world has a strangely hushed feeling. One can stand by a bridge or a mine shaft, or look along a railroad track, and sense an aspect of modern industry not possible on other occasions. "So still it is", that, in the words of Paola and Francesca, one might almost hear:

"The sigh of all the sleepers in the world  
And all the rivers running to the sea."

On such an occasion one can reflect that among the workers and watchers of that uncanny hour are sailors straining their eyes from great ships at sea; locomotive-engineers directing trains along gleaming tracks all over the country; miners in narrow tunnels hundreds of feet underground; irregular armies of men preparing for and cleaning up after the mass of day-workers; milk-men, firemen, watchmen, market-men, telegraphers, newspaper-workers.

If the night is clear, astronomers in observatories of half the world are peering at the heavens through telescopes. If the night is foggy, ships at sea are sounding fog-horns and proceeding cautiously. If rain is falling, farmers are waking up to give the matter consideration. Whether the night is fair or stormy, huge factories and blast-furnaces in the industrial districts are busy producing, and the dark forms of men are swarming about them. To see a great industrial plant in active operation in the middle of the night, when the work-a-day world is in bed, unconscious, is to realize what a vast giant modern industry is.

No other civilization, of the dozens that have flourished upon the earth, toiled by night as do modern men. Though the Egyptian civilization lasted thousands of years longer than ours has, and though they built enormous and permanent monuments, it is not likely that they worked at night to any great extent. Probably only their priests watched out the dark hours

and noted the daily drama of the skies as the dawn-goddess pieced together the stars to make the sun-god. The Babylonian astrologers were, likewise, the only outposts of the night in their fruitful valley; they distinguished the wandering planets from which we get our institution of a seven-day week. When the Romans ruled from Scotland to the Persian Gulf, they utilized the night only for surprise attacks by their soldiers, and for carousals in the Oriental style. Through the Middle Ages, the alchemists brewed their magic at night and sought for the secrets of life during the mysterious hours before daybreak. But comparatively few men in all those past periods worked the metals or manufactured textiles or sunk shafts at night. Their lack of good artificial lights, their superstitions, and the absence of an industrial urge restrained them. Only modern man toils through the hours when Selene steps from her silver car and goes to seek Endymion:

"Silver sails all out of the west  
Under the silver moon."

While the moon looks down we manufacture soap, hoist coal, and transport fertilizer!

## R. G. E. LECKIE PASSES

Major-General Robert Gilmour Edwards Leckie, whose death in Vancouver is announced as we are going to press, was the elder son of the late Major R. G. Leckie, and a brother of Colonel J. Edwards Leckie who survives him. General Leckie was a graduate of the Royal Military College, Kingston, Ont. He served with distinction in the Boer war, had many adventures in East Africa after that war, and was the moving spirit in organizing a regiment of the Seaforth Highlanders in Vancouver at the outbreak of the World War. His career overseas was in keeping with his intrepid and indomitable nature. Although not a strong man physically, he was totally regardless of risk. He was animated by the highest ideals of British tradition. An ardent Imperialist, his conception of duty was that of willing, nay, eager, sacrifice whenever danger threatened the solidarity of the Empire.

In direct contrast to his military proclivities, Leckie, in private intercourse, was a most unassuming and retiring man. His mining career, begun in Nova Scotia, was continued in British Columbia during the days of the Rossland boom. He was a prominent figure in the early days of Cobalt, where, with his father and brother, he was actively interested in several properties. After the war he settled down to military administrative duties in Vancouver.

Only those who knew Leckie well knew also his real fineness. He did not make friends rapidly. Those he had he treasured.

Leckie was a Canadian gentleman of a kind that is only too rare, — a sensitively considerate and high-spirited soldier and mining man.

The Transvaal gold output for May 1923 amounted to 786,561 fine ounces, as compared with 743,651 fine ounces for April 1923, and 629,786 fine ounces for May 1922.

\* College of Engineering, New York University.



# DEVELOPMENT AT INDIAN MINES

By ALEXANDER GRAY

IN more ways than one Indian Mines, situated across Cascade Creek from the Premier Mine in the Portland Canal District of British Columbia, may be said to be a proprietary Corporation with excellent prospects and as many certainties. It has structures that keep the management thinking; fractures and cross-fractures to be studied and worked out. A diversified mineralization and the relationship of the rocks and ore exposed in the respective tunnel levels, preclude monotony. The irregularity of the ore and ore bodies and the unusual need for raises and crosscuts in the sheared zone undergoing development, make the Indian at once one of the most complicated mining ventures and one of the most attractive. Its development cannot be hastened unduly without risk, and yet the progress being made in building up ore reserves has induced the Montreal, Toronto and London owners to protect their mining position in this way:

|                     |                            |
|---------------------|----------------------------|
| Original Holdings—  | Portland No. 1             |
|                     | Portland No. 2             |
| Later Acquisitions— | Fritz                      |
|                     | Big Dick                   |
|                     | O'Brien                    |
|                     | Morn                       |
| Latest Options —    | Boundary, Nos. 1, 2 and 3. |
|                     | Missing Link fraction      |
|                     | Pay Roll Nos. 3 and 4      |
|                     | Brookland                  |
|                     | Maggie Jiggs               |
|                     | Forty-five                 |
|                     | and intervening fractions  |

## Location of Present Workings

The present mine is on the boundary line of Portland Nos. 1 and 2. At outcrop the zone being developed was traced northward into the Morn area. The contiguous claims provide acreage and opportunities for larger operations, and the Indian Mines Company will be reorganized to that end. For the time being, however, it is the intention of the management to concentrate the work in the first claims, where three tunnels and intermediate raises and crosscuts are confidently expected to provide enough ore to warrant a mill and power plant. Before next winter the directors hope to be able to complete their plans.

The Indian was not mis-named. It has had the physical attributes of majesty and perversity. Because of what is in sight and what is reasonably assured, without indulgence in overestimates, the domesticated Indian is deemed reliable enough to stand recapitalization, more equipment and further extensive development. A policy of rapid expansion was inadvisable until detailed work more fully informed the management and it was demonstrated that the vein system warranted comprehensive treatment.

## History of the Property

Staked originally in 1911, commended and condemned, approved and belittled, retained by the Clothier brothers until Portland Canal got a fresh start from the Premier Company, the Indian might have remained inactive still, had it not been for Montreal and Toronto investors. Until then, although the original area had more or less merit in its surface

showing and in its shallow workings, there does not seem to have been sufficient ore in sight to induce outside capital to take over the properties. This was not surprising, considering that the Premier ground underwent a series of rejections by influential mining men and their engineers. Eminent geologists, also, debited the claims with the doubts raised at the Premier and by the conclusions as to secondary enrichment formed at the Big Missouri. The fracturing was regarded unfavorably. The Clothiers, perhaps the best-informed mining men in the Portland Canal District, hung on because they had to. They waited eleven years — when this happened, according to the report of the British Columbia Minister of Mines for the year 1922:

"G. B. D. Turner, of New York, a mining engineer of widely-recognized ability and experience, undertook the financing and management of the property early in the year. After a careful consideration of conditions in the vicinity of the mine and examination of the tunnels, together with such open-cuts as could be cleared of snow, he then succeeded in interesting Toronto and Montreal capital, and work was started in May (1922), with R. L. Clothier as superintendent in charge, to whose energy and efficiency is due the economical development of the mine".

Really the management had to be exceptionally energetic and capable, for working capital was slow in coming. For a while the incoming interests "handled with care" the perplexing structures. They were aware they had a large, mineralized, extensively fractured contact zone, with shearings and characteristic lenses which contained a series of ore-bodies with fat and lean shoots, the lateral and vertical extent of which called for capital and an accelerated development.

The small plant installed was inadequate for the purposes of the eastern owners. Two or three drills, however, soon put enough ore in sight to more than compensate the Montreal-Toronto syndicate. The prospects were so bright a larger exploration plant was financed. Equipment and fuel oil were hauled in on the snow last winter, the Premier company with true western spirit co-operating.

## Ore-Bodies Now Developed

This enabled the management to extend the upper tunnels and do some crosscutting of the zone. A lower tunnel was started in ore and carried along for 500 feet or so. It got off the ore, but the ore body has been re-located. At outcrop, clear to one boundary, it has been shown there is ore for a distance of about 1,000 feet. Underground there seemed to be three distinct lines of mineralization. Individually the ore bodies disclosed good values. Whether the section is to be dealt with collectively or selectively, is being ascertained. More capital, therefore, had to be forthcoming; and the company reorganization is in hand to meet the new conditions. Within a year Indian Mines has emerged from a doubtful prospect, in the estimation of some, and is blocking out ore of a value in excess of the nominal capital, the higher grade being such that shipments will be made next winter. Later on a mill will



be erected and provision made for transporting concentrate.

Some time ago Mr. Turner estimated there was partly developed ore in the upper workings, which he approximately valued at almost \$2,000,000 gross. Since then the tunnels have been extended. Here is an exhibit above the main tunnel:

|           |         |
|-----------|---------|
| Section A | \$30.50 |
| " B       | 20.58   |
| " C       | 10.85   |
| " D       | 32.20   |
| " E       | 14.20   |

Although the ore above the main tunnel level is not fully blocked out, it is sure enough to warrant the present optimism. International interest, based upon information frankly imparted by the company, has made it all the easier to meet fiscal requirements without resorting to the public. The averages of the sections as enumerated above is sustained by other sections with \$14.61, \$13.09, \$15.06 and \$13.82, respectively.

#### The Latest Developments

Indian Mines Directors, therefore, have acquired more claims. They have confirmed on the surface the extension of their ore-bodies with excellent milling grade; and what is more important, they have recently proved by crosscuts the existence of parallel fissures likely to make the mine a much larger one. Besides, as at the Premier, there is cross-fissuring that is adding to the interest and the outlook. The situation to date in this, and in other respects, is presented in a recent telegraphed report from the property, sent by Mr. R. L. Clothier, as follows:

"Number one, have found two shears practically parallel about twenty-five feet apart; have been driving on west and now crosscutting to east shear at five hundred feet from portal; uncovering ore also along west shear but expect have better report from crosscut, as have drilled into ore when starting crosscut. Situation is new and very interesting and promising. Number three is three hundred ninety feet to face. Crosscutting in ore thirty dollar grade at three hundred twelve feet from portal looks like have been driving parallel to ore-body; will later drive fifty feet north, seventy feet from face and come under portal number one. Present appearance highly satisfactory. Raise from number one shows considerable ore which is improving. Junction Indian and Morn three open cuts along distance two hundred fifty feet; first cut sixteen feet, ore exposed average fourteen gold-silver; second cut, eight feet, partially across ore-body average twenty, gold-silver-lead; third cut thirteen shows high-grade ore east side but not sufficient work done to get definite average value. Think about twelve safe for present amount work done; splendid shoot ore with excellent fissure possibilities. Morn Boundary large body of about ten ore exposed practically untouched, ten to twenty feet wide."

The latest telegraphic advice is that the crosscut in the upper tunnel shows twenty-three feet of highly mineralized material, with a value in one place over a width of 2.4 feet of 4 ounces gold and 40 ounces silver. The last crosscut in the lower tunnel shows ten feet of ore.

It should be explained that the management decided some time ago to do some crosscutting while pursuing lateral development. The result was the location of the parallel lenses. Evidently the shear zone has surprises in store; and it is the increasing belief in this that causes the management to accelerate the work. The raise referred to is underneath a high-grade surface showing. The surface sampling of the profitable ore-body at the boundary of the Indian and Morn Claims, speaks for itself. Elsewhere in the Morn there is the "large body of about \$10 ore exposed, practically untouched, ten to twenty feet wide".

This shows why the owners of Indian Mines have refused several offers for control.

#### CADMIUM IN 1922\*

Cadmium is a comparatively rare metal found in small proportions in zinc ores, being present in practically all of them, to the extent of about 1 of cadmium to 200 of zinc. On account of its close relationship to zinc it is reduced along with that metal. Most of the zinc of commerce contains cadmium. "The sources of cadmium that have been utilized are zinc ores treated by fractional distillation, lead-furnace bag house fumes (the cadmium content of which is derived from zinc minerals contained in the charge of lead ore), and residues from the purification vats of electrolytic zinc plants and lithopone plants."

The United States and Upper Silesia have produced practically the whole cadmium output of the world, though a small quantity is made at electrolytic zinc plants in England, and in 1922 Belgium and Tasmania were reported to be exporting cadmium to England. The total production in the United States for 1922 was, metallic cadmium, 131,590 pounds and cadmium sulphide, 134,774 pounds. The average price of the metal was \$1.09, and of the sulphide \$1.13 a pound. Some of the cadmium is marketed as oxide and hydrate, but no figures are available for these.

The uses of cadmium and its compounds are extending. The sulphide has long been used as a yellow paint. Lately the metal has been used for electroplating by the udyllite process. The plated articles are subsequently heated for several hours at 150°-200° C, which allows the cadmium to form an alloy with the plated metal. This process has been applied to rust-proofing locks, hardware, kitchen-cabinet and refrigerator trimmings, automobile parts and accessories, and such wire products as screen wire, wire ropes and fence wire. Cadmium resists corrosion better than zinc does. The formation of the alloy results in a closely adhering covering not subject to peeling. Although started only in 1921, this process was in use in 50 plants at the end of 1922.

Another use of cadmium is in the manufacture of cadmium lithopone, which differs from ordinary lithopone in having a deep yellow to orange color, given to the pigment by cadmium sulphide.

The cadmium-vapor arc lamp gives an intense monochromatic red light useful in scientific investigations. It is interesting to note that in this lamp the cadmium is alloyed with a very small quantity of gallium, another rare metal found in zinc ores.

\* C. E. Siebenthal & A. Stoll, Mineral Resources of the United States, 1922 Part I.



# NOVA SCOTIA COAL

Its Relation to Canada's Economic Development

By F. W. GRAY

Last week Mr. F. W. Gray, of the British Empire Steel Corporation, addressed the three hundred members of the Canadian Weekly Newspaper Association at a complimentary dinner in Sydney at which the Corporation was the host. His address, in full, follows:

It is not necessary to inform this audience, which is drawn from all parts of Canada and has arrived at this easternmost point after travelling over a great part of the country, that as Canadians we have a rich and vast heritage, and that the future of this country is so promising as to need no emphasis and to call for no exaggeration on our part.

## The Importance of Nova Scotia's Coal

Nevertheless, Canada suffers from one serious limitation, — one that, but for the resources of Nova Scotia, would in the long run be fatal to our hopes of national development and would some day force the absorption of Canada by the United States. I refer to the shortage of coal deposits in Eastern Canada. Between the coal fields of Nova Scotia and the fringe of the great coal fields of Alberta, there intervenes a distance of 1,800 miles, or as far as from England to the Caucasus, that is entirely without coal resources.

The coal fields of Nova Scotia, 70 per cent of the reserves of which are concentrated around this city, is a lone and singular occurrence in the Dominion. With the exception of some inferior coal in Chili and the coal field of Vancouver Island, it is the only coal deposit on either the Atlantic or the Pacific shores of the American continent. The nearest coal deposit in the United States is 800 miles away. These conditions give to the Nova Scotia field extraordinary economic and national value, out of all proportion to the actual extent of the field.

Coal is the basic raw material of modern civilization, and no nation can hope to become great, self-sustaining and independent that is without coal. It is not too much to say that the coal of Nova Scotia is the guarantee of economic independence, and consequently the guarantee of national independence, to Eastern Canada.

## Alberta's Fuel

In the West there is a large concentration of coal resources, which some day will cause Alberta to exceed the east as an industrial centre, and will bring population and wealth to the West in such a degree that it will become a predominating factor in the political economy of the Dominion.

The coal field of Nova Scotia, if its resources are properly used, will enable the East to hold its own, and will prove a main factor in holding East and West together in the indissoluble bond that the Fathers of Confederation planned for.

## Nova Scotia's War Service

Those who saw Sydney harbor in the war years, filled with vessels of war, troop-ships and transports, and saw the armed convoys leaving Sydney weekly,

with the regularity of a train service, gained illumination on the importance of the combined coal and steel industries to Canada. Had the neutrality of the United States during the years 1914 to 1917 been other than a benevolent one, Canada could not, without the coal of Nova Scotia, have provided men and ships, and could not have manufactured munitions or exported grain and war supplies.

From the Island of Cape Breton not less than 6,000 men went to the front, almost entirely volunteers and in large part composed of miners. As a result of this, the production of coal has been very much reduced.

## Nova Scotia Miners Essentially Sound

Readers of newspapers, particularly those published outside Nova Scotia, may be pardoned if they have an idea that social conditions are very disturbed in the mining districts of the province. It is probably true, as it is in all urban centres at this time, that sinister forces, originating outside Canada, are being exerted against society as it exists under British institutions; but it is scarcely necessary to state that a population with a war record like that of Cape Breton Island cannot, in the nature of things, contain any dangerous elements of disloyalty, and is, as it always was and will be, intrinsically sound at heart and able to deal with its own social problems in the manner approved of by our racial and national traditions.

The coalfield around Sydney is unique; 70 per cent of the reserve in the coal seams is under the sea. Coal is now being mined at distances exceeding 2¼ miles to sea, and 70 per cent of all the coal being mined in this district is won from under the sea. Our engineers are making technical history and their projects are of a character that will make Cape Breton renowned in the annals of mining engineering.

## Coal for Quebec and Ontario

A crying need of the provinces of Ontario and Quebec, from which a large part of this audience comes, is an assured supply of suitable fuel for domestic heating at a moderate price. The small householder cannot longer afford to pay from \$18.00 to \$22 per ton for anthracite and he cannot look for much relief in the price of anthracite, if any. Indeed, as the years go by it will become dearer and increasingly hard to obtain.

There is made here in Sydney from Sydney coal a by-product coke. This is a fuel that has all the desirable qualities of anthracite, but in greater degree; 8 tons of it is equal to 10 tons of the best quality commercial anthracite. By the erection of coke ovens in Montreal and other cities of Quebec and Ontario, it is possible to provide the householder with fuel that will cost him less than anthracite, will give him greater heat with less labor, and will relieve Canada of the necessity of importing anthracite. If this were done the mines of Nova Scotia would have an annual market for coal that would be absolutely dependable and steady; the quantity of coal mined in Nova Scotia

would increase and it would be unnecessary to send money out of the country for imported anthracite.

The manufacture of domestic coke from Nova Scotia bituminous coal in the large cities of Ontario and Quebec is one way in which Nova Scotia can help those provinces, and in turn receive very considerable assistance herself, and in combination add greatly to the wealth of the Dominion.

## EXPERIMENTS WITH RARE METALS STEELS

In a paper read at the May meeting of the American Electrochemical Society in New York, H. W. Gillett and E. I. Mack of the U. S. Bureau of Mines gave an interesting account of experiments made to test the influence of uranium, boron, titanium, zirconium, cerium, and molybdenum when used as alloying elements in heat-treated steels. The authors found that molybdenum is the only one of these elements that has a decided and consistently beneficial effect. "The most important property of molybdenum in steel is the control it gives of the development by heat-treatment of the properties desired . . . . . The best classification of steels . . . . . is on the basis of the properties that can be developed in them, or, what is almost the same thing, their relative propensity toward hardening. . . . . From this point of view, molybdenum is,—carbon excepted,—the most active and potent element used in steel. . . . . From every point of view it appears that molybdenum is an alloying element in steel, which in value stands with nickel, chromium, and vanadium." It is noteworthy that molybdenum gives the steel a strong tendency towards air-hardening, while vanadium has no pronounced power in this direction. On the other hand, vanadium so prevents a coarse-grained structure by decreasing the rate of growth of austenite during cooling, that it is safe to quench vanadium steel from high temperatures and thus get the desired great hardness.

## BOOK REVIEWS

**COPPER ORES**, by Robert Allen. — Monograph of the Imperial Institute — John Murray, Albemarle St., London, W.—221 pages — price 7s. 6d. net.

In this monograph, Mr. Robert Allen, Superintendent of the Mineral Section of the Imperial Institute, gives a comprehensive account of the occurrence, character, and uses of copper ores, with special reference to the British Empire, to which however, the author devotes only 36 pages. This seems rather scant treatment, especially in the light of the fact that 40 pages are given to a general description of copper ores. In this chapter the table on p. 19 showing the cost of producing copper (in the United States in 1918) is interesting as indicating that for ores carrying below 4 per cent. of copper, the cost of producing copper was more than the present selling price. The curves on p. 37 show that the price declined rapidly from the year 1801 (35 cents) to 1830 (22 cents), more slowly to 1850, after which there was a steady fall to 12 cents (1891-1900), after which the price rose fairly rapidly to present levels. The production curves show the phenomenal rise in output in the United States since 1891. Even before that date the United States had become the

largest producer, with Chile a poor second. For the period 1911-1920 Canada ranks fourth among five of the larger producers, exclusive of the United States.

The British Isles at one time supplied almost three-quarters of the copper output of the world, but "since about 1880 the output has been insignificant, and the copper mines are mostly of historical interest only."

The Otavi district in South West Africa is important, the Tsumeb mine having produced about 85,000 tons from which were shipped 36,280 tons of ore and concentrates averaging 13.5 per cent. copper, 29.3 per cent. lead, and 10.5 oz. silver per ton.

In Canada, British Columbia is the principal producing province, with Ontario a good second. The Flin Flon ore-body in Manitoba has a calculated tonnage of 16,000,000, containing approximately, copper, 1.9 per cent.; zinc, 3.8 per cent.; silver 1½ oz. and gold \$1.40 per ton.

In Australia the Mount Morgan mine, in Queensland opened in 1886 as a gold mine, and in 1903 discovered to run into a large deposit of copper ore with considerable gold values, in 1920 had ore reserves estimated at 3,437,000 tons with 2.59 per cent. copper and \$6 gold per ton.

In Tasmania the Mount Lyell is the only mine operating at present. It has ore reserves estimated at 2,815,000 tons, averaging about 3 per cent. copper, and considerable values in gold.

It appears from this carefully prepared account of the Empire's resources in copper ores that there may be very large reserves to draw upon, but these are largely lying idle, being mostly unable to compete with the more accessible or higher grade ores of the United States.

## NEW NICKEL-SILICON STEEL

Among the recent successes of the research department of the International Nickel Company is a new nickel-silicon steel which is stated to be unusually hard and tough, and to be susceptible of considerable commercial development. Nickel added to cast iron in amount from 2 to 4 per cent. has been found to increase its usefulness markedly, and a number of American foundries are experimenting with its use. The Company has produced a nickel-bearing type of stainless steel said to contain from 20 to 40 per cent. of nickel, 6 to 12 per cent. of chromium, and 0.25 to 2 per cent. of silicon, which can be readily machined and fabricated. One rolled sample tested gave:—Tensile strength, 100,000 lbs. per sq. in.; yield point, 60,000 lbs.; elongation in 2in., 20 per cent.; and reduction of area 50 per cent. Seamless nickel tubes are now available, made from malleable nickel, amenable to the process by which seamless tubes of copper and steel are produced.

## SOURCES OF ARSENIC

Most of the white arsenic of commerce is obtained as a by product from ores of silver, cobalt, nickel, gold, and copper; but mispickel, sulph arsenide of iron, is sometimes found in veins, with quartz gangue, in sufficient quantity to be a paying proposition for arsenic alone. The mineral is easily recognized by its great weight, its bright silvery or lead-gray color, its hardness, and the smell of garlic when the mineral strikes fire with steel.



# GEARS

A Description of the Various Kinds, their Characteristics and their Use

Copyright of Hamilton Gear and Machine Co., Toronto

## Worm Gears

The American Gear Manufacturers Association has been doing some valuable standardization work in gear practice, the following data being a result of their investigations. When ordering gear it will be well to note the improved form of worm gear rim and the standard formulae for outside diameter and width of face.

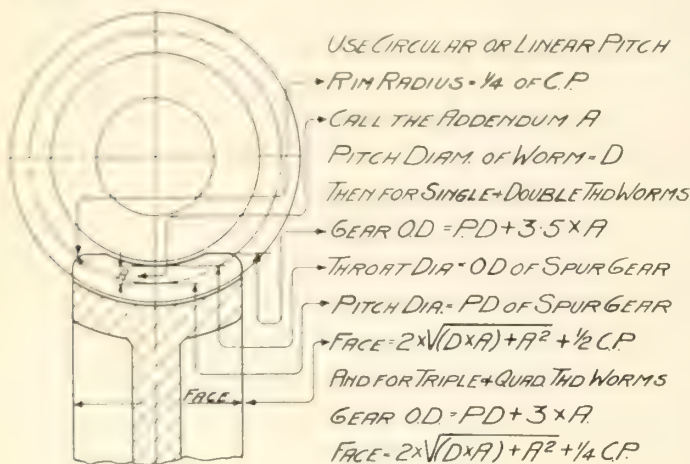
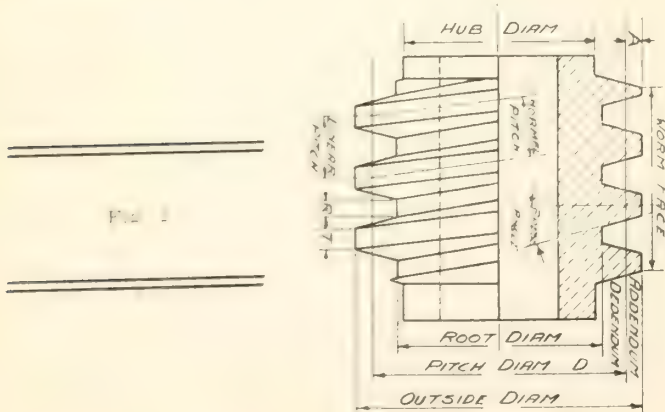


Fig. 1.

Worms with less than about 12 degrees helix angle are not reversible, but are self locking. The maximum efficiency and minimum frictional loss is found at about 45 deg. helix angle, but any angle above 25 deg. gives relatively high efficiency. Low angle worms have low efficiency on account of the large proportion of slide relative to roll between the teeth. For this reason lubrication is especially important on worm gears, and the oil must be of high enough viscosity so it will not be squeezed out by the load and leave metal-to-metal contact. Spur or bevel gears with mostly rolling contact can survive such conditions, but not so the worm. Enclosed gear cases with submerged worms are recommended. The thrust bearing is a vital point. It must be carefully designed and well lubricated.



Referring to diagram (Fig. 1) we have shown the improved form of rim section and the formula. This form of rim has a number of important practical advantages. It has additional bearing surface where it is useful i.e. in the region of the pitch lines of the worm and of the gear. It eliminates the high up-standing corners of the old style which were of very little bearing value because they were so far above the real pitch line of the gear.

Omitting these high corners cures the interference troubles between the tips of gear teeth and the worm tread. This interference was formerly always present except where these tips had been thinned away by the use of an extra long hob. In the latter case the tips were then mere idle metal. The new style rim with its wide, flat face and shallow grooves is easier and cheaper to machine, there is less metal to be removed and the rough casting weighs less. The rounded corners make it easy to handle and the flat face permits large gears to be rolled along the shop floor, which could not be done with the old style on account of battering the points. For the same reason there is less risk of damage in shipment.

## Worm Gear Enclosed Drives

Worm gears have a number of advantages over other types; also some disadvantages. They are specially adapted to high ratios of speed reduction, can be made irreversible and are quiet. These features frequently more than balance their lower mechanical efficiency.

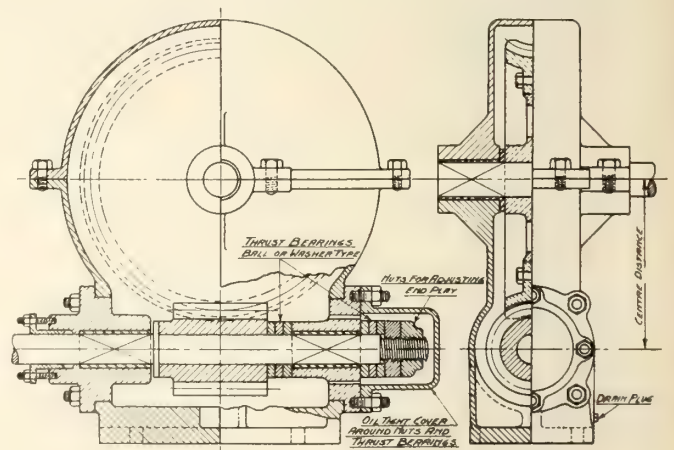


Fig. 3.

The latter is due to power lost in sliding friction between gear and worm thread and in the thrust. For these reasons, correct design, accuracy of workmanship and ample lubrication are essential. (Fig. 3)

To meet the requirements of lubrication, to carry the thrust load and maintain rigid alignment, the modern self-contained worm gear case has been designed. It also performs two other important functions, viz: it encloses and protects all moving parts and it transmits the waste heat from the power loss in the teeth to the large outside surface where it is radiated. This matter of getting rid of the heat may be an important point in continuous operation of gears of low helix

angle and therefore low efficiency. The best all-round lubricant is heavy, steam-refined transmission oil of a viscosity high enough to maintain its lubricating value at the operating temperature. This will vary in different cases.

In order to be irreversible, gears must have a helix angle of less than ten or twelve degrees. Gears of high ratio are made for single thread worms of low helix angle. The efficiency rises with the helix angle, (though not directly proportional) to a maximum at forty-five degrees, although anything over thirty is high.

Bronze is the best material for the gear. In large gears it is economical to make only the rim of bronze. For moderate service cast iron is satisfactory. Worms are nearly always steel and frequently are hardened. For heavy duty, high class work they are hardened and ground on the threads. The ball-bearing thrust is best, but the washer thrust of alternate bronze and hardened steel is good, and is usually the correct bearing for the reverse thrust.

### Clearance

Referring to Fig. 4, it will be noticed that the whole depth of the tooth of a gear exceeds the depth that it meshes with its mate by an amount called clearance. The depth of mesh or engagement is called the working depth and is equal to the sum of the addendum of the gear and the addendum of the pinion.

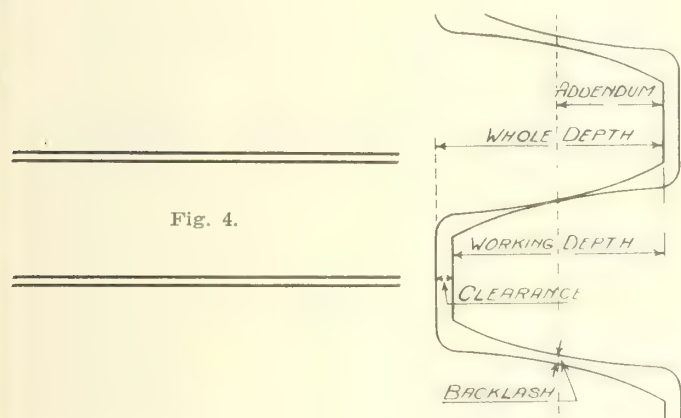


Fig. 4.

Do not confuse the term clearance with backlash. The latter is the slack or play between the working surfaces of the gear and its mate measured at the pitch line.

It is important that sufficient clearance be provided so that the tooth will not bottom in the mate when meshed tightly. It is also important not to have an excessive clearance that would weaken the tooth at the root. Between these two limits, the exact amount of clearance matters very little. There are several different standards, which are valuable as production

and tool standards, but the gear user should beware of deceiving himself into thinking these are absolute.

The quality of finish in the clearance space is another point on which misunderstandings sometimes arise. As this is not a working face there is no need for a good finish, especially as it is always covered by the accumulated lubricant. Bevel gears and coarse pitch spurs are usually cut in two or more operations and frequently, especially in bevels, the marks of the stocking tool are left in the clearance. These marks do no harm.

### Bevel Gear Dimensions

There is often considerable confusion of terms in describing the size of a bevel gear, and its relation to its mate. To aid in preventing trouble the following diagram and explanation will be found of great assistance. (Fig. 5)

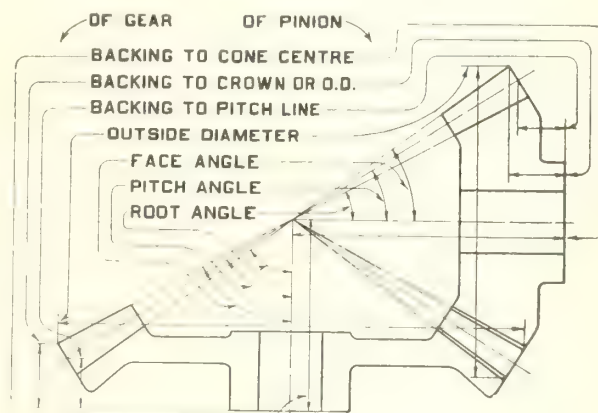


Fig. 5.

It must be understood that bevel gears are not calculated singly but in pairs, and even if only one of the pair is to be made, it is necessary to know the number of teeth in the mate, or the ratio of the teeth of the two gears.

The pitch is measured at the large end of the tooth. The pitch diameter and number of teeth are figured the same as for a spur gear. The outside diameter is the pitch diameter plus double the cosine of the pitch angle, divided by the diametral pitch.

Figure separately for gear and pinion. The pitch angle is found from a table of tangents. The number of teeth in a gear (or pinion) divided by the number of teeth in its mate gives the tangent of the pitch angle. The face angle is the sum of the pitch angle and the addendum angle. The addendum angle is found from the tables of sines and tangents. Twice the sine of the pitch angle divided by the number of teeth gives the tangent of the addendum angle.

### Cut Gears vs. Cast or Moulded

It is only for very coarse, slow-moving work or some jobs where the load and speed are both low and the price is a prime factor, that the use of moulded tooth gear is at all justified, and better gears pay in the long run. (Fig. 6)

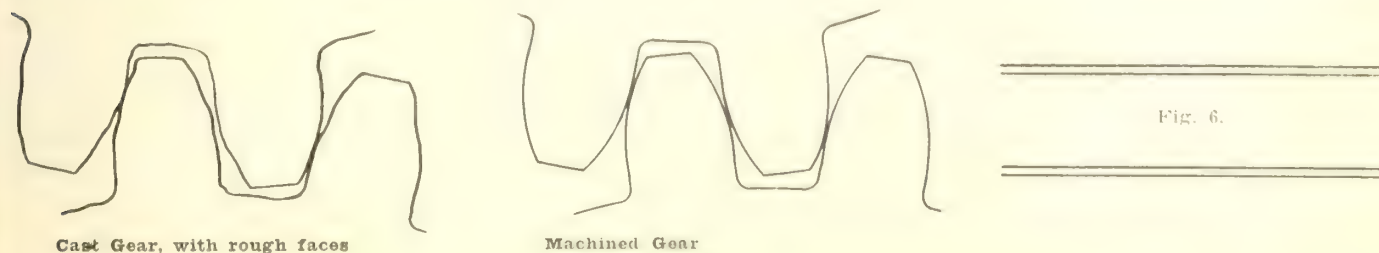


Fig. 6.



Good cut gears are quiet, and cast gears are always noisy, not only because the surface is rough, but the pitch is usually far from uniform. The noise is only a demonstration of vibrations that tend to wreck the whole structure. The human efficiency and output of a man working beside a noisy drive are noticeably less than in a quiet location. This is not just theory; it is a well-known fact.

Cast gears absorb more power because of the friction of the rough surfaces and the errors in pitch and tooth thickness, which cause a varying angular velocity of the driven gear. They are weaker than the corresponding cut gear because the load is concentrated on the high spots of the rough and often badly shaped tooth face. These high spots are quite as likely to be at a corner as anywhere else, giving maximum stress and liability to breakage. When worn smooth the cast gear suffers from excessive backlash and loss of tooth form.

None of these difficulties arise with gears that have correctly cut teeth. On herringbone gears with generated helical teeth the action is especially perfect. There is no noise, no shock and when mounted rigidly in an enclosed oil-case this is the highest type of power transmission apparatus.

(to be continued)

### "ELEKTRON ALLOYS"

"Elektron" is the name of a group of alloys, whose composition approximates to 95% magnesium, 4.5% zinc and 0.5% copper, the yield point being about 12 tons, with ultimate strength of some 18 tons per sq. in. and elongation about 20% on two inches. The appearance of elektron is much like that of aluminium but without the bluish tint. The melting point is 630–650° C., and melting must be done in iron, and not graphite, crucibles. It is subject to atmospheric corrosion but soon acquires a protective film of oxide. Its most distinguishing feature is its extremely low specific gravity, which is about 1.80 as compared with 2.67 for pure aluminium. This property makes it of value for special purposes, and it would appear to be particularly suitable for aircraft, at least for accessories if not for the more vital parts.

Dr. Thomas, in a recent issue of *Metallkunde*, discussing the objections raised to the use of the alloy, pointed out that the danger of inflammability during casting can be easily avoided by reasonable care. In the molten condition, "Elektron" will decompose water into its explosive gases, but there seems to be no reason why in that state it should be brought into contact with water. The dust arising from machining is undoubtedly explosive if allowed to accumulate.

Magnesium, the base of this and similar alloys, is not, as its high price would suggest, a rare metal, as magnesium minerals are very plentiful in the crust of the earth. There seems to be no reason why the magnesium chloride of sea water and the vast magnesian limestone or dolomite formations should not in future furnish the raw materials, and such sources are of course quite inexhaustible.—The Metal Industry.

### MAGNESIUM ALLOYS

Ultra-light alloys are those having a specific gravity of less than 2, the light alloys and metals ranging from 2 to 3. Magnesium, with a specific gravity of 1.72, is the only commercial metal for the production of the former as above defined.

One producer each in France, England and Germany, at present turns out magnesium, the method being that of electrolysis from a molten mixture of the chlorides of magnesium and potassium. The Ashcroft process uses a double electrolyte and has recourse to an intermediary lead-magnesium alloy. German so-called "Elektron" alloys, up till the past few years, contained chiefly zinc. At present the ultra-light alloys are, for the most part, ternary zinc-aluminium-magnesium alloys. For internal combustion engine pistons, alloys are used having 12% copper.

The ultra-light alloys, with the mechanical characteristics they at present possess, offer great advantages from the point of view of weight reduction in structures. It is illusory to try to increase the resistance and elastic limits of such alloys so long as one does not raise the moduli, according to certain definite proportions. The possibility of sufficiently increasing the moduli of these alloys does not appear to be very extensive.

To utilize these alloys for minute and long thin parts would be a grave error when mechanical properties come into question, and for constructional purposes it would be necessary to entirely modify our conceptions in a direction which should take due regard of the nature and limitations of the material under review.—Le Génie Civil.

### THE DEEPEST MINE

The St. John del Rey mine in Brazil is now being worked at a depth of 6,726 feet below the surface, the deepest point to which human beings have as yet penetrated the crust of our globe. As the temperature of the wall-rock at this depth is high (117 deg. F.) it has been found necessary to cool the ventilating air at the surface by a special refrigerating device. The mine has been operated by the present English company since 1837. The ore is a mixture, in approximately equal proportions, of quartz, ankerite, and pyrrhotite, the last containing good gold values.

### SALT IN 1922

According to a statement issued by the United States Geological Survey, the quantity of salt produced and marketed in the United States in 1922 (classed by varieties) was as follows: evaporated, 2,276,683 short tons; in brine, 2,569,042 short tons; and rack salt, 1,947,124 short tons. The total value was \$27,464,839. These figures show an increase of 36 per cent. in quantity but of only 12 per cent. in value over those for 1921. The producers of common salt reported also the recovery and sale of calcium-magnesium chloride amounting to 33,067 short tons, valued at \$571,326, and bromine and bromides equivalent in the aggregate to 1,005,174 pounds of bromine, valued at \$150,668.

### PLACERS IN GLACIATED REGIONS

In glaciated regions, gold placers may have been scattered by the ice-action; or as at Cedar Creek, B.C., the placer may have been left undisturbed, but covered with glacial gravel. In the Cariboo district this covering is so deep in some parts that valuable placers long escaped discovery. While the time since the close of the glacial period has been too short for the formation of important placers by erosion, some payable placers have been formed by resorting of the gravels that have been scattered by the glaciers.



# THE MINING DISTRICTS

By THE JOURNAL'S CORRESPONDENTS

## BRITISH COLUMBIA

**Granby Properties Inspected.** — Col. J. T. Crabbe, president of the Granby Consolidated Mining & Smelting Co., is visiting British Columbia. He is making a personal inspection, accompanied by Mr. H. S. Munroe, general manager, of the company's properties in this Province. Col. Crabbe expresses himself as pleased with the company's achievements in 1922. There was produced over 30,000,000 pounds of copper, 405,471 ounces of silver and 6,996 ounces of gold. The average price obtained for copper was 13½ cents and the average cost of operation was 9.15 cents per pound. Fine dust from Anyox treated at the Tacoma smelter yielded nearly 2,500,000 pounds of copper and 37,033 ounces of silver. The low cost of operation had placed the company in a favorable position with its competitors. He was pleased, also, with the colliery operations at Cassidy, some 220,013 tons of coal having been produced during the year and either marketed or consumed by the company.

**Survey of Copper Mountain.** — Dr. Victor Dolmage, head of the British Columbia Branch of the Geological Survey of Canada, has left Vancouver to make a survey of the mineralized portion of Copper Mountain. It is here that the ore-bodies are located that will be exploited by the Granby Consolidated Mining & Smelting Co. George F. Barnwell, professor of mineralogy in the Missouri School of Mines; William Smith-eringale, of the University of B. C.; and J. Buckle, of McGill University, will accompany the party.

**B. C. Arsenic for Japan.** — British interests are reported to be trying to obtain 1,000 tons a month of arsenic for shipment to Japan. There are deposits of arsenic in this Province but at present only one producer, the Hedley Gold Mining Co., whose last year's output of some 500 tons realized about \$100,000.

**Trail Ore Receipts.** — Ore receipts at the Trail Smelter, Consolidated Mining & Smelting Co. of Canada, for the first week in June aggregated 7,368 tons, which brings the total for the year to date up to 201,038 tons. Detailed shipments for the week follow:

|                                  | Tons  |
|----------------------------------|-------|
| Alamo, Alamo . . . . .           | 44    |
| Bell, Beaverdell . . . . .       | 36    |
| Company Mines . . . . .          | 6,814 |
| Emerald, Salmo . . . . .         | 33    |
| Knob Hill, Republic. Wn. . . . . | 273   |
| Silversmith, Sandon . . . . .    | 176   |
| Standard, Silvertown . . . . .   | 28    |
|                                  | 7,384 |

L. K. Armstrong, of Spokane, Wn., secretary of the Columbia Section of the American Institute of Mining & Metallurgy, has been inspecting some mining properties in the Kaslo District, B. C.

**Stem-Winder to Resume Operations.** — M. S. Davys, of Kaslo, contemplates the re-opening of the Stem-Winder Group of mineral claims in the Cranbrook district. There is a large body of ore exposed on this

property, which has been a producer in the past and, if the price of zinc holds, it is thought that it may be made to yield profits.

**Dr. Hanson Suggests Consolidation.** — Dr. George Hanson, of the Geological Survey of Canada, has expressed the view that the Alice Arm District, may look forward to a bright future from a mining standpoint. The Dolly Varden, he is quoted as saying, is far from a "done" mine, and he advocates the consolidation and operation of the larger low-grade silver properties adjacent to and including that mine. This would involve the installation of a transportation system of short tram lines from some five or six properties surrounding the Dolly Varden to a centrally located concentrator. He also suggested that profits may be obtained by the exploitation of small high grade silver veins as now is being done on the Esperanza Mine.

**Coal Output Lower.** — Coal production in British Columbia fell off materially in the month of May as compared with April, the difference being some 28,242 tons. Vancouver Island collieries are responsible, to a large extent, for the drop, their output in April being 115,628 tons and in May 97,367 tons, a margin of 18,261 tons. In the Nicola-Princeton field the chief producer, Coalmont Collieries, mined about the same tonnage in May as in April and in the Crow's Nest Pass Coal Field there was a slight decline, about 7,415 tons.

From this it is clear that the sharp fall is due to conditions on the coast. Early in May it was apparent that the collieries were finding the market weak, because the mines were worked on short time and there was a general tendency to cut down output. The explanation generally given is the lack of demand for coal for domestic use with the advent of warmer weather; but this does not fully meet the situation, as the bunker trade has been very slack. It is reported, however, that the collieries recently have renewed some large contracts and already there are signs of improvement.

|                                              | Tons    |
|----------------------------------------------|---------|
| Production figures for May in detail follow: |         |
| Vancouver Island . . . . .                   | 97,367  |
| Nicola-Princeton . . . . .                   | 15,709  |
| Crow's Nest Pass . . . . .                   | 49,236  |
|                                              | 162,312 |

**Picnics for the Miners.** — The annual employees' picnics are much enjoyed and keenly anticipated events by the coal miners of the Canadian Collieries (D) Ltd. and the Western Fuel Corporation of Canada. On these occasions the men are given a full day's holiday, which is spent on ground adjacent to the Companies' main plant, and men, women, and children, employers and employees, devote themselves to having a good time. There are all manner of sports, group and individual competitions, and plenty of appetizing things to eat and satisfying liquids to drink. Dates for this year's events already have been announced. The Western Fuel Corporation's employees will hold



their plants on the 30th June at Newcastle Island and the outing of the Canadian Collieries (D) Ltd will be held, at a place not yet announced, on the 21st July.

**Bore holes near Nanaimo.** — It is announced that boring tests carried on by the Canadian Collieries (D) Ltd. in the Sable River District near Nanaimo, Vancouver Island, have demonstrated that the coal beds of this region are capable of a production of 3,000 tons a day for 300 years.

**Cassidy does Well.** — Col. J. T. Crabbe, president of the Granby Mining & Smelting Co., who has been inspecting the company's holdings in British Columbia, expresses satisfaction with the result of operations at the Cassidy Collieries, Vancouver Island. He states that the 220,013 tons of coal produced at Cassidy last year were won at a low cost per ton and that coal raising, both to supply the fuel needs of the company and for general market purposes, is becoming a more important branch of the operations of the company in this province.

**Crow's Nest Annual Meeting.** — The annual meeting of the Crow's Nest Pass Coal Co. Ltd. was held at Fernie B.C. on June 8th last when directors were elected as follows: Messrs W. R. Wilson, H. B. McGiverin, W. H. Robinson, E. P. Earle, A. H. McNeill, J. T. Maher, F. F. Edgar, L. C. Gilman, and Dr. G. W. Howland. Officers were elected as follows: President, W. R. Wilson; vice president, H. B. McGiverin; vice-president, W. H. Robinson; treasurer, A. Klauer; Comptroller, G. H. Hess Jr.; secretary, J. S. Irvine. The report of President Wilson for 1922 indicated a balance to profit and loss account at the end of 1921 of \$84,857.88, after payment of Federal taxation, etc. To this was added \$213,959.05, this being the company's net profits from all sources of the operations of the year 1922. After making provision for the Dominion income tax for 1922, amounting to \$21,001.27, there was left a total of \$192,957.78. "During the year", Mr. Wilson continues, "the directors have paid four dividends of 1½ per cent. each, making a total of 6 per cent for the year, amounting in all to \$372,690.00 leaving a debit balance of \$94,874.34 to be carried forward and provided for during 1923." It is shown that the Company spent last year \$35,293.80 on improvements and that the coal mined in 1922 totalled 569,339.14 tons as against 774,847 tons mined in 1921. The coke produced was 46,368 tons compared with 66,569 tons in 1921. Mr. Wilson concludes: "The decreased production in each case has been attributable to the five months' strike."

The President's address in moving the adoption of his report is of special interest as setting out the conditions that prevailed in the coal districts last year, and those now facing coal mine operators in this part of the Province. He said:

"In moving the adoption of the report, I am in the unpleasant position of having to state that the operations of 1922 were seriously affected through contentions about international coal mine wages.

"In 1921, our wage scale agreement expired on the 31st of March, 1922, at a time when the chief co-dependent industries on coal had come to realize the necessity for accepting a lower ratio of wages for the purpose of helping to re-establish such industries. It was, therefore, reasonable to presume that those especially engaged in the production of coal would take the same broad view of things, and at least recognize

the fundamental necessity of agreeing to the acceptance of a reduced scale of wages for coal mining work that would be in harmony with what had been done by other classes of labor that were engaged in other co-dependent industries. These expectations were not realized, for those responsible for the guidance of coal mine labor on this continent specifically refused to accept the belief that any concessions in the form of reduced wages for coal mining communities were necessary at that time. The controversy continued from April 1st, 1922, to the latter part of August of the same year, or about five months, during which time this company's mines were not only unproductive, but were under serious daily cost in the form of caring for continual mine drainage and general maintenance charges. The employees of the company lost during the five months of the strike about \$1,200,000 in wages, and the company correspondingly endured the loss that resulted from the maintaining of idle plants for five months.

"After five months' contention, a temporary understanding was reached between the United Mine Workers of America, and the operators of this district, to re-open the mines and carry on operations at the 1921 wage scale rates until April 1st, 1923. During March, 1923, it was further agreed by the interested parties to allow 1921 and 1922 wage scale agreements to continue for one more year, which understanding we are now working under.

"From what I have stated, it may be noted that this district is still continuing to pay the high scale of coal mine wages stimulated by the exigencies of the late war. The result of these high wages and correspondingly high cost of production is creating a new set of adverse and discouraging conditions for this district in particular, for through the high cost of coal fuel, the railroads that this company in particular largely depended upon for the economic operation are replacing coal fuel by oil fuel, which they have only done after patiently waiting for two years to see coal prices return to more normal selling prices. In addition to this, smelters are prevented from accepting the lower grade of ores because of the abnormally high prices of coke due to the high wages. I may here, before closing my remarks, note that when wages are increased in this district, the cost of production becomes magnified over and above the cost of coal mining fields that are operating under more favorable physical conditions, such as uniformity of structural coal bedding, good overlapping roof and greater freedom from dangerous gas generation. For example, the day wage men in our mining fields here, due to the abnormal physical conditions we have to deal with, will exceed the day wage labor employed under the more favorable physical and structural conditions in Western Pennsylvania and West Virginia by from 100 to 300 per cent., which necessary and excessive application of day labor affects the cost of production in about the following corresponding ratio:

|                                                                    |     |
|--------------------------------------------------------------------|-----|
| Western Pennsylvania percentage of day men average about . . . . . | 30% |
| Virginia percentage of day men average about . . . . .             | 25% |
| This District percentage of day men average about . . . . .        | 60% |

"During the seven months' operations the mines produced 569,339 tons of coal, the Michel ovens pro-



ducing only 46,368 tons of coke. The low production is largely accounted for by five months' suspension of operations, or strike.

"In co-relation to the stated production, the following corresponding development work was done in the Mines during the year:

|                                     |              |
|-------------------------------------|--------------|
| At Coal Creek Mines:                |              |
| Narrow Development work amounted to | 44,115 feet: |
| At Michel Mines:                    |              |
| Development work amounted to        | 6,225        |
| Total for all Mines during 1922     | 50,340       |

"The preceding figures fully maintain the developed capacity of all mines up to 4,500 tons per day of eight hours operations. It may here be interesting to mention that at the close of 1922 the combined measurements of all the main roadways in the Company's Mines amounted to 164,126 feet, or 31 miles.

"During the year, the Company installed 16,420 feet of new water lines for spraying the working places, or for the purpose of allaying the light floating coal dust generated in the working faces.

"I may further remark that during the year, the United States Government have placed a reciprocal tariff against Canadian coal of 53 cents per ton on all grades of coal except slack that goes through a three-quarter inch screen, and 14 cents per ton on the three-quarter inch slack. This tax, it is needless for me to state, is proving to be a further detriment to the production at these mines".

**Hope for Alberta Coal Shipments.** — Howard Stutchbury, coal commissioner for the Province of Alberta, has returned from Ontario and other points in Eastern Canada highly pleased with the reception given him in his endeavor to establish a market for coals of Alberta. A good market for Alberta domestic coals can be developed in Eastern Canada providing a competitive freight rate can be secured. This is Mr. Stutchbury's opinion and he states that the effort to obtain the required transportation adjustments is to be continued until it meets with success or is definitely refused. He estimates that the importation of coal for all purposes into Canada from the United States represents an expenditure of over one hundred million dollars a year. These funds and their possibilities for the building up of this new country are lost unnecessarily, he argues. The retention of this huge sum would stabilize both the labor and industrial situations of Alberta.

**June Output to be Larger.** — Late reports from Vancouver Island Collieries prove that a decided change has set in this month and that the production for June is likely to be considerably in excess of that of last month. No. 5 Mine, South Wellington, Canadian Collieries (D) Ltd., which has been shut down temporarily is operating again, some 150 men being employed. Practically all the other mines are working well up to capacity.

It is also stated that the new slopes in No. 5 Mine, Cumberland, Canadian Collieries (D) Ltd., upon which the company has been working for several weeks, have struck coal. One of these slopes went through rock for a distance of 450 feet. These improvements will facilitate the mining of coal in this field and the result should be apparent shortly in an increase in output.

## NOVA SCOTIA

**Journalists Visit Sydney.** — To learn the tastes and the needs of certain sections of the Canadian public, three hundred delegates of the Canadian Weekly Newspaper Association gathered in Halifax last week and after completing their business enjoyed a delightful visit to the historic land of Evangeline, now hidden in fragrant apple blossoms. Leaving Annapolis, this group of journalists steamed into Sydney station, where they were met at the train by citizens of Sydney and the colliery towns, and taken out to see not only the wonderful scenery round about Sydney, but the more wonderful industries of the Sydney steel plant and the collieries.

As these happy men and women looked out on the great stretch of waters in this almost land-locked harbor, which sheltered the convoys of war days, they were loud in exclamations of wonder and praise, and outspoken as to their growing appreciation of their own country, its magnificence and its resources. The program arranged beforehand led them through the steel works with its gigantic mills, its great blast and open hearth furnaces, and its many other departments. From here the party had a run out to the coal mines at New Waterford. The route lies along the side of Sydney harbor, and on this beautiful June morning, the water sparkled and shimmered in the summer sun.

**Visiting the Mines.** — At the collieries the visitors had an opportunity to study the fuel problem of Canada on the ground. Questions were freely asked and answered, and in a few hours the men who make and mould to so great an extent the public opinion of Canada fully understood one feature at least of this pressing problem. Here on the surface lay large piles of timber, used to support the roof underground when the coal is removed. At other points were large stocks of material such as gravel, sand and stone for use both above and below ground. The compressor houses with their many engines, each developing 600 H.P., to supply the mining machines underground, and the great pipe lines used to carry this compressed air miles into the mines, the boiler plants, the bank-heads with their picking belts and screens for cleaning and assorting coal, the fans for ventilating the mine, the haulage engines for drawing the coal out of the collieries, all are part of the surface equipment. The machine shops, the forges and repair shops, the ware houses, bath houses, first aid stations, and stables, are all necessary adjuncts to a first-class colliery. These were all visited, after which many went into the mine to see the underground workings. But all the time, the mind and eye were busy and the usual conclusion expressed was that it requires much money to open up a coal mine. When in answer to a direct question as to the cost, it was stated that to equip and develop a single colliery costs about \$2,000,000, no surprise was expressed, for the point had been demonstrated.

To most of the visitors it was all new and strange, but very illuminating. The depth of the mine, which runs out under the sea two miles, and the quality of the coal were discussed. Many souvenirs were carried away from No. 12 Colliery in the shape of small pieces of coal. New Waterford district has a splendid quality of coal; its lustre catches the eye and leaves no doubt in the mind that it ranks high as a fuel.



**The Company Houses.** — Turning towards the company houses, a desire was expressed to visit these. The nearest house was entered, and the good lady was informed very courteously that gentlemen much interested in the social welfare of the Canadian people would like to see through her house. The request was graciously granted. The house was semi-detached, or what is known in the colliery districts as a double house. It stood fenced in, within a large yard, with sufficient ground for a garden large enough to satisfy any workman. In the rear stood a garage. The first room entered was nicely furnished and spotlessly clean and contained a piano and victrola. A well-painted oak stove stood in the kitchen, and we had a peep at the well-stocked pantry. Upstairs were four bed-rooms. The house had electric light, and rented for \$6.00 per month. It was remarked that few gardens were planted, but a retort from one of the visitors settled the point when he pointed to the many garages and autos possessed by miners, and consequently the lack of time to care for a garden.

Another house was entered in another village. It stood in a plot of ground covering three-eighths of an acre, and was fenced in. In the rear was a small barn and coal house built by the company. The barn was used as a garage. This house was self-contained, with four large rooms downstairs and five up. It had electric light and running water, and was rented for \$6.00 per month. Here, again, the occupants had well-furnished rooms, a piano and victrola and a nice library. The owner possessed an auto and he was one of four miners living quite close together, who owned up-to-date cars.

"What are the miners kicking about? and what is all this stuff that we have been reading about in the papers?" inquired one of the editors. "How much do these men earn?" inquired another; and when told that miners that cut coal earn all the way from six to ten dollars per day, and sometimes much more, the common exclamation was, "Why, they all earn more money than we do! The people of Canada ought to know the true circumstances of the Nova Scotia miners. No doubt they are entitled to good wages, but why should they continue to agitate and keep the Province in an uproar?"

#### Complimentary Dinner at Sydney

A spin to Sydney over a road that ranks with any in Canada brought the party back to the Yacht Club, in time to get ready for luncheon. The visitors were the guests of the British Empire Steel Corporation and the catering was in the hands of the I. O. D. E., who reached the hearts of all with their kind attentions. So while the heart throbbed and thrilled to the patriotic strains of our National Anthem and songs, the feast was spread and heartily enjoyed. A pleasing souvenir in the form of steel cuff-links bearing the letters B. E. S. Co. was found in a small envelope placed beside each plate.

W. H. Bishoff, General Superintendent, Dominion Iron and Steel Company acted as toast-master, and his breezy pleasant manner at once placed everyone at ease. After speeches by the officers of the Press Association, who emphasized the national side of Canadian life, and told of the great work accomplished by means of the weekly newspaper, which papers were treasured in almost every home. The industrial side was referred to. Mr. W. F. Gray gave a most

lucid talk on the fuel problem of Canada as he saw it. This was one of Mr. Gray's finest efforts. He had a splendid audience, all eager to catch every word and syllable he let fall. He was quick to recognize the opportunity, and in rising to the occasion he placed the case of the coal and steel industry of Nova Scotia in a light never before realized by the great majority who listened to him.

T. J. Brown, Deputy Minister of Mines, who had already prepared the way for the visitors by writing a most delightful description of Cape Breton in the "Chronicle's" Tourist Edition, and who had accompanied the party all the way from Halifax, in an eloquent and glowing speech emphasized the necessity of having the promises made at Confederation faithfully carried out by the sister provinces. The "jewel in the swine's snout", as he termed his native province of Nova Scotia, must not be forgotten. The diamonds may be black, but they have a lustre all their own, and form part of the great mineral wealth, without which Canada would be poor indeed.

With flags flying, streamers fluttering in the breeze, and all hands singing "O Canada", the party sailed down Sydney Harbor, through the beautiful Bras d'Or Lakes and when the symmetrical Bird Islands, which sentinel the enchanted land, had been passed, the imagination was captured by the splendid scenery of the headwaters of the Bras d'Or Lake which

"In all its length far winding lay,

In promontory, creek and bay."

Landing at Iona, the party moved on to Prince Edward Island, the home of the New England Royalist. Here their descendants till the soil, fertile fields give forth the golden grain, and this once black spot in the Atlantic is now called the "Garden of the Gulf".

**Successful Candidates at Examinations.**—Of the 249 candidates who went up for the Mining Examinations fifteen passed for mine managers, forty-four underground managers, forty-seven overmen, and ten examiners; first-class engineers six, second-class six, third-class fifty-five. The examiners state that the educational standard of the younger men passing through the schools is very much higher than when examinations first began to take place. The work is done very much better and the examiners feel proud of the work of the applicants.

#### FALL MEETING OF ELECTROCHEMICAL SOCIETY

The next meeting of the American Electrochemical Society is to be held in Dayton, Ohio, on September 27th to 29th. The papers will include a symposium on "Recent Progress in Electrolytic Refining," under the chairmanship of F. R. Pyne, of the United States Metals Refining Co. There will be an innovation, consisting of round table discussions of electric furnace brass foundry practice, organic electrochemistry, chlorine and electroplating. Visits will be made to local plants.

#### PERIDOT

This is the jeweller's name for crystals of olivine. When clear, transparent, and free from flaws, they are of value as gems. They may be found in basic igneous rocks such as peridotite, and in crystalline limestone.



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Mining Engineer

Assoc. M. I. M. M.  
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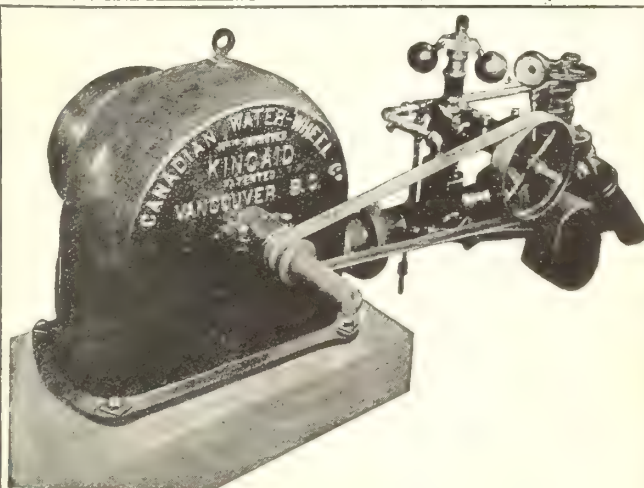
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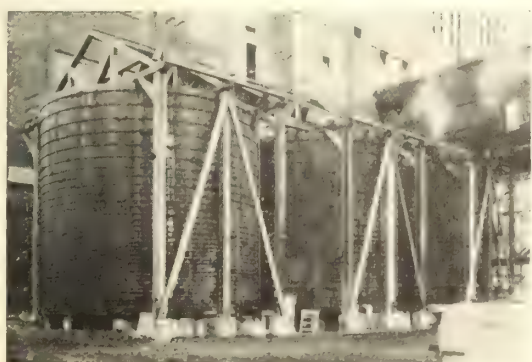
The "KINCAID" water-wheels deliver the full theoretical power calculated from a given quantity of water from a stated head.

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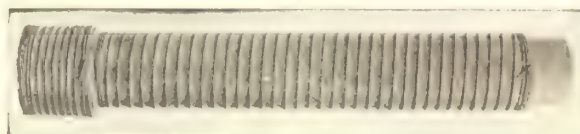
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# PROVINCE OF QUEBEC

## MINES BRANCH

Department of Colonization, Mines and Fisheries

The chief minerals of the Province of Quebec are Asbestos, Chromite, Copper, Iron, Gold, Molybdenite, Phosphate, Mica, Graphite, Ornamental and Building Stone, Clays, etc.

### MINISTER OF COLONIZATION, MINES AND FISHERIES, QUEBEC

**MINER'S CERTIFICATES.** First of all, obtain a miner's certificate, from the Department in Quebec or from the nearest agent. The price of this certificate is \$10 and is valid until the first of January following. This certificate gives the right to prospect on public lands and on private lands, on which the mineral rights belong to the Crown.

The holder of the certificate may stake mining claims to the extent of 200 acres.

**WORKING CONDITIONS.** During the first six months following the staking of the claim, work on it must be performed to the extent of at least twenty-five days of eight hours.

**SIX MONTHS AFTER STAKING.** At the expiration of six months from the date of the staking, the prospector, to retain his rights, must take out a mining license.

**MINING LICENSE.** The mining license may cover 40 to 200 acres in unsurveyed territory. The price of this license is \$10.00 an acre per year, and a fee of \$10.00 on issue. It is valid for one year and is renewable on the same terms. The holder must produce an affidavit that during the year work has been performed to the extent of at least twenty-five days' labour on each forty acres.

**MINING CONCESSION.** Notwithstanding the above, a mining concession may be acquired at any time at the rate of \$5 an acre for SUPERIOR METALS, and \$3 an acre for INFERIOR MINERALS.

The attention of prospectors is especially called to the territory in the North-Western part of the Province of Quebec north of the height of land, where important mineralized belts are known to exist.

**PROVINCIAL LABORATORY.** Special arrangements have been made with POLYTECHNIC SCHOOL of LAVAL UNIVERSITY, 228 ST. DENIS STREET, Montreal, for the determination, assays and analysis of minerals at very reduced rates for the benefit of miners and prospectors in the Province of Quebec. The well equipped laboratories of this institution and its trained chemists ensure results of undoubted integrity and reliability.

The bureau of Mines at Quebec will give all the information desired in connection with the mines and mineral resources of the Province, on application addressed to

**HONORABLE J. E. PERRAULT,**

The Mining Law gives absolute security of Title and is very favourable to the Prospector.

# BRITISH COLUMBIA

## The Mineral Province of Western Canada

Has produced Minerals valued as follows Placer Gold, \$76,542,203; Lode Gold, \$109,647,661; Silver, \$59,814,266; Lead, \$51,810,891; Copper, \$170,723,242; Zinc, \$24,625,839; Coal and Coke, \$238,289,565; Building Stone, Brick Cement, etc., \$36,605,942; Miscellaneous Minerals, \$1,358,839; Making its mineral production to the end of 1922 show an

## Aggregate Value of \$734,259,619

The substantial progress of the Mining Industry of this Province is strikingly exhibited in the following figures, which show the value of production for successive five-year periods: For all years 1895, inclusive \$94,547,241; for five years, 1896-1900, \$57,605,967; for five years, 1901-1905, \$96,717,068; for five years, 1906-1910, \$125,534,474; for five years, 1911-1915, \$142,072,603; for 5 years 1915-1920, \$189,922,725; 1921, \$28,066,641; for the year 1922, \$35,158,843.

## Production During last ten years, \$339,280,940

Lode-mining has only been in progress for about twenty-five years, and not 20 per cent. of the Province has been even prospected; 300,000 square miles of unexplored mineral bearing land are open for prospecting.

The Mining Laws of this Province are more liberal and the fees lower than those of any other Province in the Dominion, or any Colony in the British Empire.

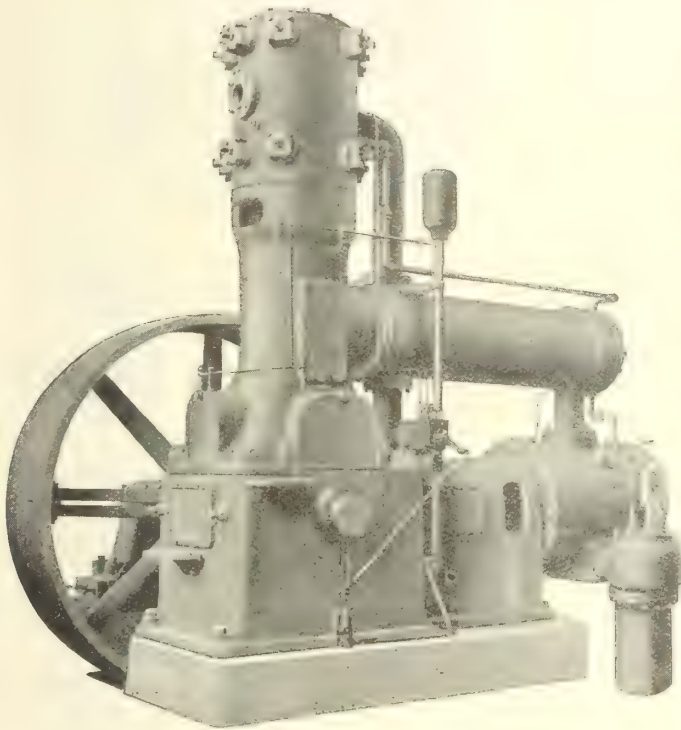
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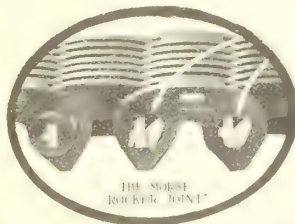
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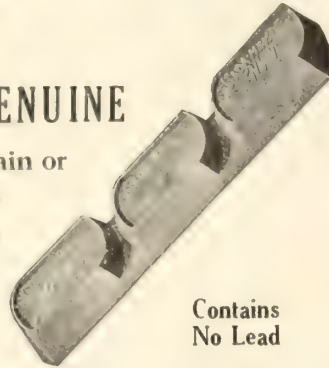
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Holman Bros. Ltd.  
Wettlaufer Bros.

**Roller Chain:**

Hans Renold of Canada, Ltd.  
Canadian Link-Belt Co., Ltd.  
Jones & Glassco, Regd.

**Rope — Manilla & Jute:**

Jones & Glassco, Regd.  
Allan, Whyte & Co.

**Rope — Wire:**

Anglo Canadian Wire Rope Co.  
Allan, Whyte & Co., Ltd.  
Canada Wire & Cable Co.  
Canada Wire & Iron Goods Co.  
Dominion Wire Rope Co., Ltd.  
Greening, B. Wire Co.

**Saline Refiners:**

Goldsmith Brothers.

**Samplers:**

Canada Metal Co.  
Ledoux & Co.  
Milton Hersey Co.  
Thos. Heyes & Son.  
Mine & Smelter Supply Co.

**Screens:**

Canadian Ingersoll-Rand Co., Ltd.  
Greening, B. Wire Co.  
Hendrick Mfg. Co.  
Canada Wire & Iron Goods Co.

**Screens — Cross Patent Flanged Lip:**

Hendrick Mfg. Co.

**Screens — Perforated Metal:**

Hendrick Mfg. Co.

**Screens Shaking:**

Canadian Link-Belt Co., Ltd.  
Hendrick Mfg. Co.

**Screens — Revolving:**

Canadian Link-Belt Co., Ltd.  
Hendrick Mfg. Co.  
The William Kennedy & Sons, Ltd.

**Separators:**

Smart-Turner Machine Co.  
Mine & Smelter Supply Co.

**Sewer Pipes:**

Wettlaufer Bros.

**Shaft Contractors:**

Hendrick Mfg. Co.

**Sheet Metal Work:**

Hendrick Mfg. Co.

**Sheets — Genuine Manganese Bronze:**

Hendrick Mfg. Co.

**Sheets and Dies:**

Hull Iron & Steel Foundries, Ltd.  
Peacock Brothers, Ltd.  
The William Kennedy & Sons, Ltd.

**Ship Loaders: see Conveyors**

Canadian Mead-Morrison Co.

**Silent Chain: See Chain Drives**

Silent & Steel Roller—See Roller Silent Steel.

**Sledges:**

Canada Foundries & Forgings.

**Sintering:**

Dwight & Lloyd Sintering Co., Inc.

**Smelters:**

Goldsmith Bros.

**Smoke Stacks:**

Can. Chicago Bridge & Iron Co., Ltd.  
Horton Steel Works, Ltd.  
Hendrick Mfg. Co.  
The William Kennedy & Sons, Ltd.

**Special Machinery:****Spelter:**

The William Kennedy & Sons, Ltd.  
Consolidated Mining & Smelting Co.

**Sprockets:**

Hans Renold of Canada, Ltd.  
Canadian Fairbanks Morse Co., Ltd.  
Canadian Link-Belt Co., Ltd.  
Jones & Glassco, Regd.  
The William Kennedy & Sons, Ltd.

**Spring Coil & Clips Electric:**

Canadian Steel Foundries, Ltd.

**Stamp Batteries:**

Herbert, Alfred, Limited.  
Holman Bros., Ltd.

**Stamp Forgings:**

Canada Foundries & Forgings, Ltd.  
Hull Iron & Steel Foundries.

**Steel Barrels:**

Smart-Turner Machine Co.

**Steel Castings:**

Canadian Steel Foundries, Ltd.  
Canadian Brakeshoe Co., Ltd.  
Hull Iron & Steel Foundries, Ltd.  
Hadfields, Ltd.  
The William Kennedy & Sons, Ltd.  
Denver Rock Drill Mfg. Co., Ltd.  
Sullivan Machinery Co.  
Peacock Brothers Ltd.  
Canadian Ingersoll-Rand Co., Ltd.  
Canadian Mead-Morrison Co.

**Steam Hoisting Engines:**

Canadian Mead-Morrison Co.

**Steel Drums:**

Smart-Turner Machine Co.

**Steel Manganese:**

Hadfields Ltd.  
Hull Iron & Steel Foundries Ltd.  
Canadian Steel Foundries, Ltd.

**Steel Plate Construction — Light and Heavy:**

Hendrick Mfg. Co.  
The William Kennedy & Sons, Ltd.

**Steam Engines — See Engines Steam:****Steam Traps:**

Canadian Sirocco Co., Ltd.  
Laurie & Lamb.

**Steel-Tool:**

N. S. Steel & Coal Co.  
Hadfields, Limited.

**Stone Breakers:**

Holman Brothers, Ltd.  
Canadian Ingersoll-Rand Co., Ltd.  
Denver Rock Drill Mfg. Co.  
Herbert, Alfred, Limited.

**Stone Quarrying Machinery:**

Canadian Ingersoll-Rand Co., Ltd.  
Denver Rock Drill Mfg. Co.  
Sullivan Machinery Co.

**Structural Steel Work — Light:**

Hendrick Mfg. Co.  
The William Kennedy & Sons, Ltd.

**Sulphate of Copper:**

The Mond Nickel Co., Ltd.

**Surveying Instruments:**

C. L. Berger.

**Switches:**

Canadian Steel Foundries, Ltd.

**Switches and Turntables & Frogs:**

John J. Gartshore.

**Tables — Concentrating:**

Mine & Smelter Supply Co.

**Tanks:**

Can. Chicago Bridge & Iron Co., Ltd.  
Horton Steel Works, Ltd.

**Tanks — Acid:**

Can. Chicago Bridge & Iron Co., Ltd.  
Horton Steel Works, Ltd.  
Ontario Wind Engine & Pump Co.

**Tanks — Wooden:**

Gould, Shapley, & Muir Co., Ltd.  
Ontario, Wind Engine & Pump Co.  
Pacific Coast Pipe Co., Ltd.  
Mine & Smelter Supply Co.

**Tanks, Cyanide, Etc.:**

Can. Chicago Bridge & Iron Co., Ltd.  
Hendrick Mfg. Co.  
Horton Steel Works, Ltd.  
Ontario Wind Engine & Pump Co.  
Pacific Coast Pipe Co.

**Tanks — Steel:**

Canadian Ingersoll-Rand Co., Ltd.  
Can. Chicago Bridge & Iron Co., Ltd.  
Horton Steel Works, Ltd.  
Hendrick Mfg. Co.  
The William Kennedy & Sons, Ltd.

**Tanks — Oil Storage:**

Can. Chicago Bridge & Iron Co., Ltd.  
Horton Steel Works, Ltd.

**Tanks — Water & Steel Towers:**

Can. Chicago Bridge & Iron Co., Ltd.  
Horton Steel Works, Ltd.

**Tires — Auto, Truck and Bicycle:**

Canada Foundry & Forgings, Ltd.  
Gutta Percha & Rubber, Ltd.  
Hadfields, Ltd.

**Trailers:**

Sylvester Mfg. Co., Ltd.

**Track, Manganese Steel:**

Canadian Steel Foundries, Ltd.

**Trackworks — (Manganese-Steel):**

Hull Iron & Steel Foundries, Ltd.  
Canadian Steel Foundries, Ltd.

**Tramway Points & Crossings:**

Hadfields, Limited.

**Transformers:**

Northern Electric Co., Ltd.

**Transmission Appliances:**

Jones & Glassco, Regd.

**Transmission Machinery:**

Canadian Link-Belt Co. Ltd.  
Hans Renold of Canada, Ltd.  
Jones & Glassco, Regd.  
The William Kennedy & Sons, Ltd.

**Troughs (Conveyor):**

Hendrick Mfg. Co.

**Trucks:**

Hamman Steel Car & Eng. Works.

**Tubs:**

Hadfields, Limited.

**Tube Mills:**

Canada Foundries & Forgings, Ltd.  
Herbert, Alfred, Limited.  
Holman Bros., Ltd.  
The William Kennedy & Sons, Ltd.  
Mine & Smelter Supply.

**Tube Mill Balls:**

Canada Foundries & Forgings, Ltd.  
Holman Bros., Ltd.  
Herbert, Alfred, Limited.  
Hull Iron & Steel Foundries, Ltd.  
Peacock Brothers, Ltd.  
The William Kennedy & Sons, Ltd.

**Tube Mill Liners:****Turbines — Waterwheel:****Turbines — Steam:**

Laurie & Lamb.  
The William Kennedy & Sons, Ltd.

**Turbines:**

Beliss & Morcom, Ltd.  
Laurie & Lamb.  
Herbert, Alfred, Limited.  
Hull Iron & Steel Foundries, Ltd.  
Peacock Brothers, Ltd.  
The William Kennedy & Sons, Ltd.

**Turbo Blowers & Compressors:**

Canadian Ingersoll-Rand Co., Ltd.

**Uranium:**

Everitt & Co.

**Vacuum Pumps — see Pumps, Vacuum:****Ventilating Systems:**

Canadian Sirocco Co., Ltd.

**Vises:**

Philip Gies Foundry.  
The William Kennedy & Sons, Ltd.

**Water Jet Drifting Drill:**

Canadian Ingersoll-Rand Co., Ltd.  
Sullivan Machinery Co.

**Welding — Rod & Flux:**

Prest-O-Lite Co. of Canada, Ltd.

**Wheels and Axles:**

Hadfields, Limited.  
The William Kennedy & Sons, Ltd.

**Winches — Power Driven:**

Canadian Mead-Morrison Co.

**Winding Engines — Steam & Electric:**

Canadian Ingersoll-Rand Co., Ltd.  
Herbert, Alfred, Limited.  
Holman Bros., Ltd.  
Anglo-Canadian Wire Rope.  
Canada Wire & Cable Co. Ltd.  
Greening, B. Wire Co.

**Wire:**

Anglo-Canadian Wire Rope.  
Greening B., Wire Co.

**Wire (Bare and Insulated):**

Canada Wire & Cable Co., Ltd.

**Wire Rope — see Cable:**

Allan, Whyte & Co., Ltd.  
Anglo Canadian Wire Rope.  
Canada Wire & Iron Goods Co.  
Dominion Wire Rope Co., Ltd.  
Greening, B. Wire Co.  
Standard Underground Cable Co. of Canada, Limited.  
Northern Electric Co., Ltd.

**Wire Rope Fittings:**

Anglo Canadian Wire Rope.  
Canada Wire & Iron Goods Co.

**Wire Cloth:**

Greening, B. Wire Co.  
Canada Wire & Iron Goods Co.

**Wire Chains:**

Greening, B. Wire Co.

**Wolfarm Ore:**

Everitt & Co.

**Zinc:**

Consolidated Mining & Smelting Co.  
Greening B. Wire Co.

**Zincblum:**

Everitt & Co.



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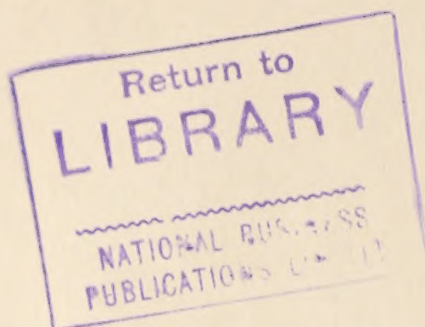












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